Australian Government
Department of Agriculture

National Residue Survey: Enhancing Australia's Trading Reputation

Chemicals in the Meat Industry

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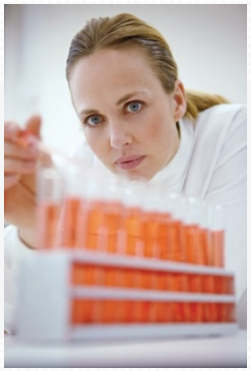
Some Background

- NRS established in 1963 following DDT residues found in beef exports to the US.
- Mandatory requirement to support export certification under *Export Control Act 1982.*
- Approximately 9,500 animal product samples are collected annually for analysis of agricultural and veterinary chemicals (registered & unregistered) in addition to environmental contaminants.
- Plus 7,100 plant product samples collected annually.
- NRS Operates under a Quality Assurance Program: ISO 9001:2008.



Scope of Activities

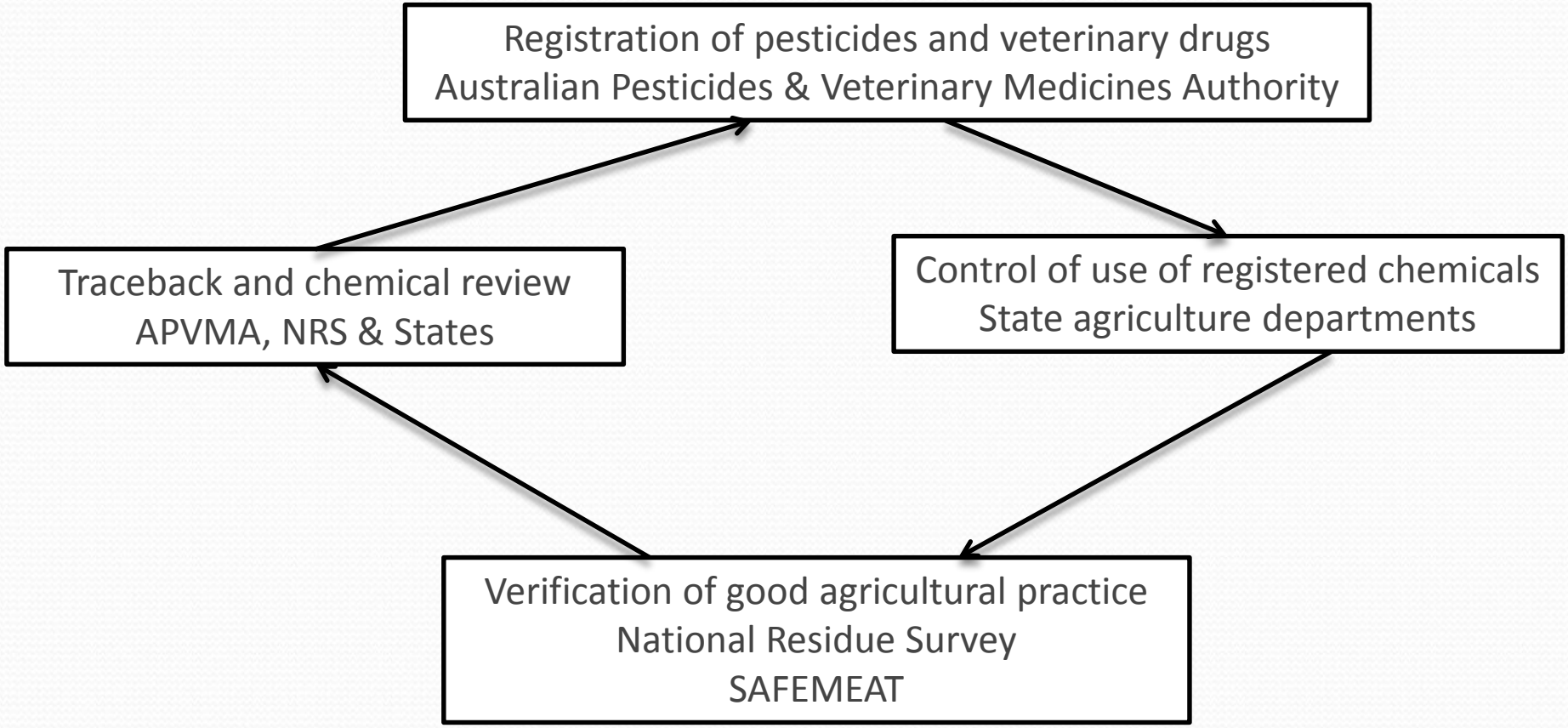
NRS Administration Act 1992

Contaminant: a substance will be a contaminant if it is an impurity which gives consumers health, safety or cleanliness concerns.

Includes:

- residues (from use of agricultural & veterinary medicines)
- environmental contaminants (Hg, Cd, Pb)
- mycotoxins (aflatoxin, patulin, zearalenone, deoxynivalenol)
- GMOs
- micro-organisms

Australian Residue Management Framework



Role of NRS

Manages national residue monitoring programs for participating animal & plant industries.

Provides an independent audit of residue integrity.

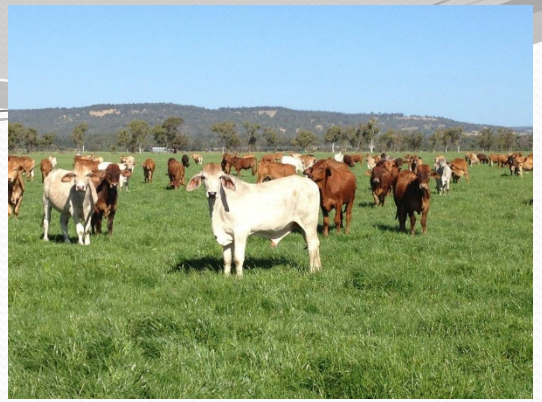
Residue testing results support:

- export certification of animal & plant commodities
- domestic quality assurance programs

Provides accumulated residue testing data to:

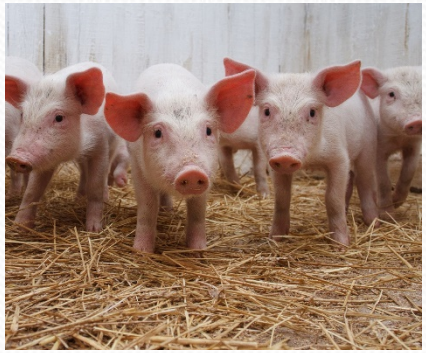
- support ongoing or new market access
- demonstrate long term integrity of Australian exports

Products covered by the NRS



Animal

- Major animal species: cattle, sheep and pigs.
- Minor animal species: camel, deer, emu, goat, horse, kangaroo, ostrich, poultry, wild boar, eggs, honey, aquaculture fish and wild-caught seafood.



Plant

- Cereal grains: wheat, barley, maize, oat, sorghum & triticale.
- Pulses: beans, peas, lentil, lupins & vetch
- Oilseeds: canola, safflower, linseed & soybean
- Horticulture including almond, apple, citrus, macadamia nuts, onion & pears.

NRS Activities

1. Program development – consultation with industry & government.
2. National collection of samples via on plant veterinary officers and accredited collectors.
3. Sample transportation – freight contracts.
4. Analysis of samples – oversight of 12 contract analytical laboratories.
5. Reporting of results to industry and government.
6. Advice to State Authorities for traceback investigation of violative residues.

What do we test for?

Chemical screens for the 2014-15 Cattle Programme

Chemical screen	Chemical group	Analytes
Veterinary drugs and animal treatments	Anthelmintics	Approximately 21 analytes including benzimidazoles and macrocyclic lactones
	Antibiotics	Approximately 58 analytes including aminoglycosides, anticoccidials, antimicrobials, beta lactams, cephalosporins, macrolides, phenicols, sulphonamides and tetracyclines
	Hormones	Approximately 12 analytes including resorcylic acid lactones, steroids, stilbenes and trenbolone
	Other veterinary drugs	Approximately 31 analytes including beta-agonists, andro and non-steroidal anti-inflammatory drugs
Agricultural chemicals, animal treatments and environmental contaminants	Fungicides, herbicides, environmental contaminants and insecticides	Approximately 81 analytes including benzoyl ureas, carbamates, fungicides, herbicides, insecticides, organochlorines, organophosphates, persistent organic pollutants and pyrethroids
	Metals	Approximately 5 analytes including antimony, arsenic, cadmium, lead and mercury

Note – Sheep and Pig Programmes include the same chemical groups but may have different analytes.

Compliance Rates over the past 5 years

Years	Cattle Compliance rates (%)	Sheep Compliance rates (%)	Pig Compliance rates (%)	Goat Compliance rates (%)
2010−11	99.93	99.78	99.85	100
2011−12	99.95	99.75	99.93	100
2012−13	100	99.85	99.96	100
2013−14	99.96	99.76	99.92	99.6
2014−15	99.96	99.68	99.51	100

Compliance Rates of Animal Products for 2014-15

	Samples	Violations	Compliance %
Camel	8	0	100.00%
Cattle	4375	2	99.95%
Deer	13	0	100.00%
Emu	9	1	88.89%
Goat	155	0	100.00%
Horse	116	1	99.14%
Kangaroo	50	0	100.00%
Ostrich	3	0	100.00%
Pigs	1020	5	99.51%
Poultry	330	0	100.00%
Sheep	2543	8	99.69%
Wild Boar	50	2	96.00%
Aquaculture	135	0	100.00%
Wild Caught Seafood	70	0	100.00%
Eggs	122	5	95.90%
Honey	126	1	99.21%
	9125	25	**99.73%**

What do we find?

The Cattle Programme 2014-15

Chemical screen	Chemical group	Samples collected	Compliance rates (%)
Veterinary drugs and animal treatments	Anthelmintics	660	100
	Antibiotics	1400	99.9*
	Hormones	440	100
	Other veterinary drugs	430	100
Agricultural chemicals, animal treatments and environmental contaminants	Fungicides, herbicides, environmental and insecticides	1115	100
	Metals	330	99.7#

* 1 above MRL – oxtetracycline # 1 above MRL - lead

What do we find?

The Sheep Programme 2014-15

Chemical screen	Chemical group	Samples collected	Compliance rates (%)
Veterinary drugs and animal treatments	Anthelmintics	330	100
	Antibiotics	470	100
	Hormones	333	100
	Other veterinary drugs	330	100
Agricultural chemicals, animal treatments and environmental contaminants	Fungicides, herbicides, environmental and insecticides	750	100
	Metals	330	97.6#

8 above MRL – 6 cadmium, 2 lead

What do we find?

The Pig Programme 2014-15

Chemical screen	Chemical group	Samples collected	Compliance rates (%)
Veterinary drugs and animal treatments	Anthelmintics	250	100
	Antibiotics	270	98.4*
	Hormones	250	100
	Other veterinary drugs	250	100
Agricultural chemicals, animal treatments and environmental contaminants	Fungicides, herbicides, environmental and insecticides	250	99.6#
	Metals	250	100

* 4 above MRL – lasalocid, tetracycline, monesin # 1 above MRL - cryomazine

Causes of Residues

Residues may occur when:

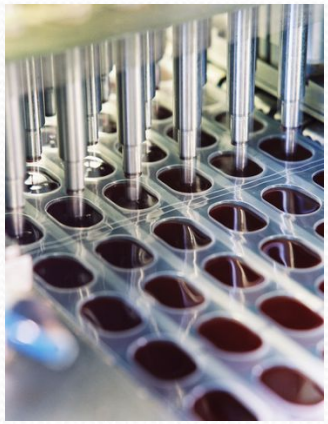
- veterinary chemical label instructions or veterinary directions are not followed
- the withholding period (WHP) or export slaughter interval (ESI) of a veterinary chemical is not observed
- livestock are exposed to chemicals used to control weeds, insects or pests.
- unregistered chemicals are used on livestock – these chemicals don't have WHPs and are of an unknown residue risk
- livestock access hazardous materials such as lead batteries often found in places like the farm dump, sheds, old yards, old house sites or painted materials
- livestock are grazed on land contaminated with persistent chemicals such as organochlorines (e.g. old potato paddocks, orchards, stock feed treated with a pesticide like pickled grain).

Keeping Livestock Free from Residues

Avoid residues by:

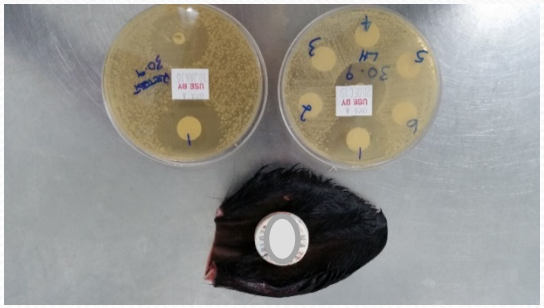
- following all veterinary chemical label directions or veterinary directions
- observing the WHP or ESI
- conducting a farm risk assessment to identify contaminated sites
- testing soil in areas where persistent chemicals may have been used
- restricting stock access to contaminated sites like farm dumps.
- avoiding lead exposure – prevent stock access to lead batteries
- avoiding exposure to chemicals used to treat weeds or pests.
- identify animals exposed to residues – ensure livestock with residues do not end up in the food chain
- check chemical records before selling animals – correctly declare if sale animals are inside or outside of the WHP on the National Vendor Declaration waybill.

Chemical screen development



Chemical screens are developed based on assessment of:

1. International market access requirements.
2. Previous results and product coverage.
3. Availability of suitable sampling & analytical methods.
4. Likelihood of residues occurring in the product.
5. Agricultural & veterinary chemicals registered for use.
6. Maximum Residue Limits (MRLs) in destination markets.
7. Public health perception of the chemical by international and domestic regulators.
8. Advice from Technical Panel (NRS, Department, APVMA & State Authorities).



Matrix selection

The material usually selected for analysis is the one that is expected to contain the highest concentration of a residue.

The material may be inedible, and does not necessarily represent the part most likely to be eaten.

Fat - pesticides
Kidney - antibiotics
Liver - metals
Urine or faeces - hormonal growth promotants

Sample collection

The NRS operates an online database which provides an interface with the sample collector and the NRS for all sample collections.

•Sample requests are generated in the Information Management System (IMS) based on establishment slaughter throughput.

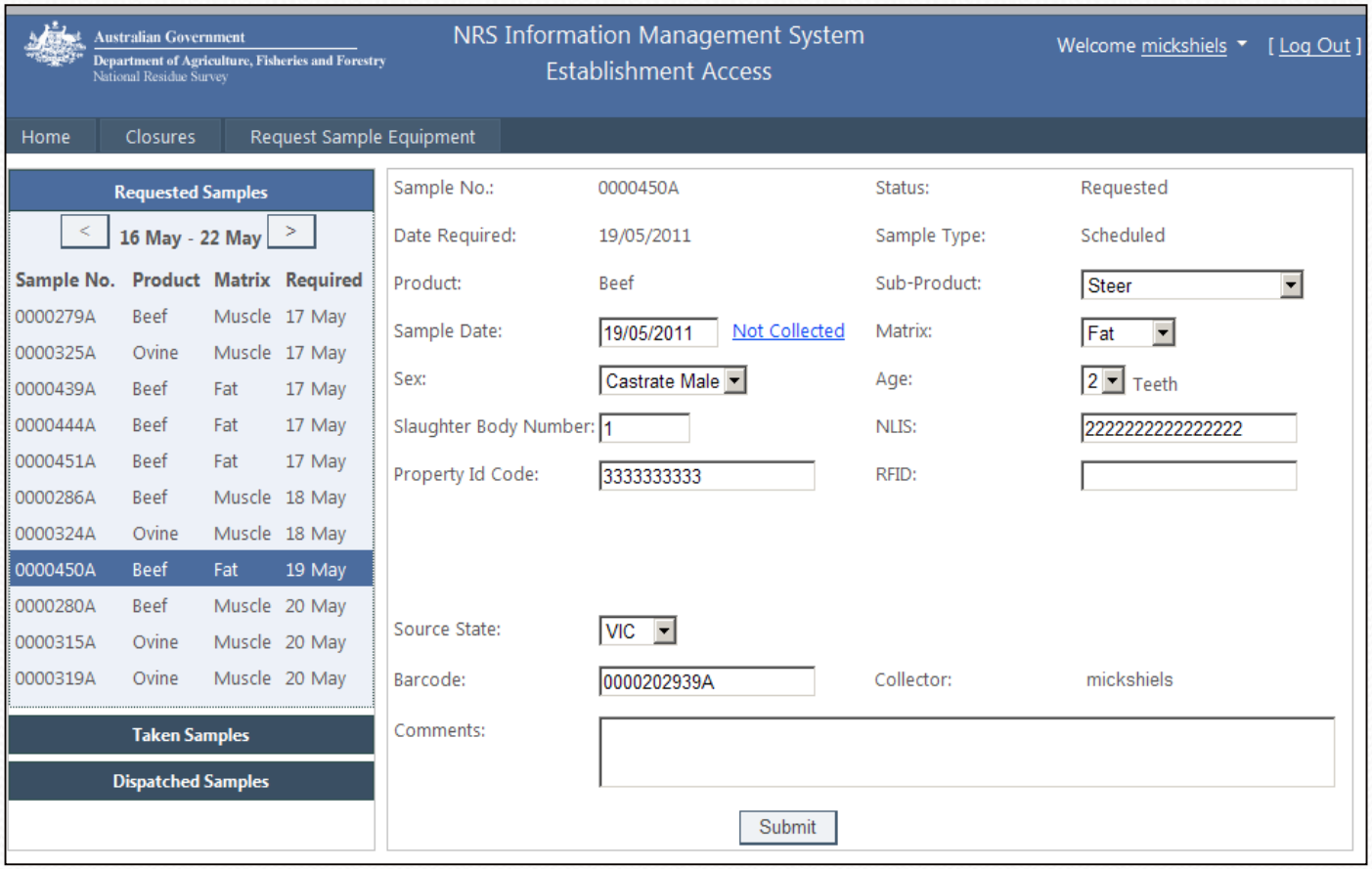
• Samples are collected in tamper-proof satchels by departmental on-plant veterinary (OPV) officers at export establishments or approved sample collectors at.

• Collected samples are sent by overnight courier to the Central Receival and Dispatch (CRAD) for batching to laboratories for analysis.

• Chain of custody is verifiable at all times via the IMS.

Traceability

Property Identification Code or animal tattoo, collar and or RFID is essential for tracing an individual animal.



Laboratories

NRS analytical programs are undertaken by 12 contract labs.

- Small laboratory community.
- Not based on reference laboratories.
- No distinction between government/private labs.
- Do not prescribe “official” methods.
- Labs procured through open, competitive tender (>1993) based on:
  1. demonstrated performance in NRS PT
  2. NATA accreditation
  3. value for money
- Contracts awarded for specific analyte/matrix combinations.

Traceback investigation of violative residues

Upon confirmed violative result.

1. NRS requests State Authority undertake on-farm investigation to identify cause.
2. State Authority provides education to producer to prevent recurrence or regulatory action if required e.g. quarantine.
3. NRS reports outcomes to Australian Pesticides and Veterinary Medicines Authority (APVMA) where relevant.
4. LPA audit requested after completion of traceback.

Results >1/2 MRL are referred to State for "information only". In some cases the State will investigate e.g. Pb.

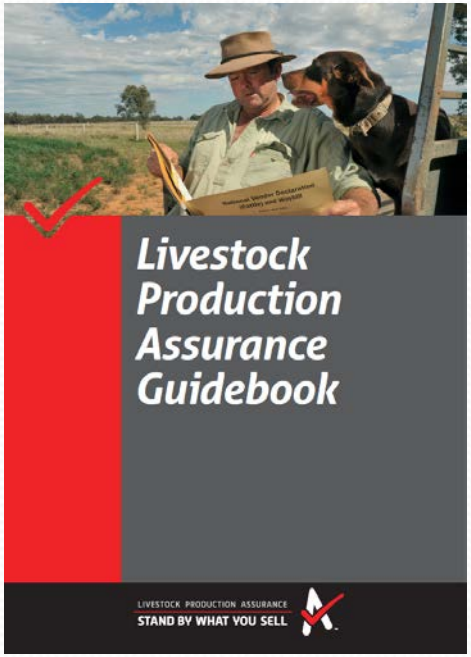
Targeted animal testing programs

A number of targeted testing programs are undertaken in cattle, sheep and pigs including:

1. Targeted Antibacterial Residue Testing (TART)
2. Sheep Targeted Antibacterial Residue Testing (START)
3. Pig Targeted Antibacterial Residue Testing (PTART)
4. National Organochlorine Residue Management (NORM)
5. National Antibacterial Residue Minimisation (NARM)

On-farm audit program

- National on farm audit program is conducted to assist in the verification of on-farm practices where food-producing animals are reared.
- Audits are performed against five criteria established in the Livestock Production Assurance (LPA) scheme including animal transportation, traceability, animal treatments, stock food and property risk assessments.
- In 2014 approximately 5,000 audits were undertaken Australia-wide on cattle, sheep and goat properties.



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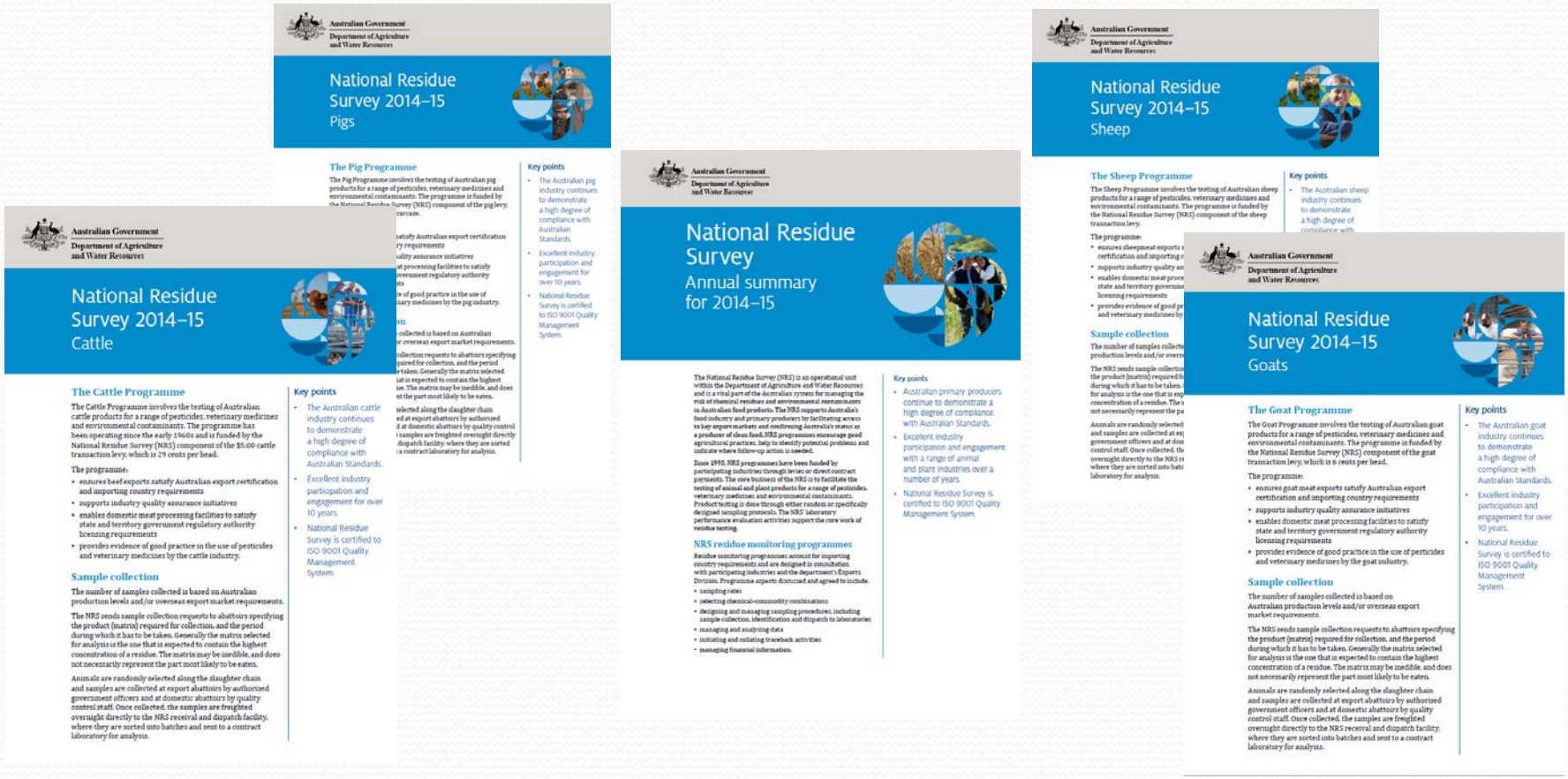
Australian Government
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National Residue Survey 2014–15
Pigs
The Pig Programme
Key points
National Residue Survey 2014–15
Cattle
The Cattle Programme
Key points
The Australian cattle industry continues to demonstrate a high degree of compliance with Australian Standards.
Excellent industry participation and engagement for over 10 years.
National Residue Survey is certified to ISO 9001 Quality Management System.
Sample collection
National Residue Survey
Annual summary for 2014–15
NRS residue monitoring programmes
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Sheep
The Sheep Programme
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Goats
The Goat Programme