Proficiency Tests Handbook

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Foreword

The National Residue Survey (NRS) Proficiency Test (PT) Handbook 20th Edition provides information for laboratories interested in participating in NRS proficiency testing programs for residues of agricultural chemicals, drugs, natural toxins and environmental contaminants in animal products, plant materials, food, feed and other inputs to production. The second issue of the 20th Edition of the PT Handbook provides a correction to the specified NRS LOR values for the analytes of Program 38: Anaesthetics in fat. All other information remains the same as that provided in issue 1. The NRS PT offered is based on the range of NRS random monitoring programs that will be operating in the 2023-2024 period. NRS is accredited by the National Association of Testing Authorities (NATA) as a Proficiency Testing Scheme provider.

This 20th Edition of the PT Handbook presents information on:

- the organisation and operation of NRS PT programs
- PT performance assessment
- PT program specifications and sample characteristics
- possible uses of PT results by other clients, particularly the Department of Agriculture, Fisheries and Forestry Meat Export Program.

Laboratories should note that there have been some program changes since the 19th Edition NRS Handbook (August 2022).

Whilst participation is compulsory for NRS contract laboratories, I would like to encourage other laboratories to participate in the NRS PT programs set out in this Handbook.

Karina Budd

Director, Residue Chemistry and Laboratory Performance Evaluation

National Residue Survey
2 May 2023

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Introduction

The NRS is an operational unit monitoring chemical residues and other contaminants in Australia's agricultural produce and food commodities. It operates to facilitate export and domestic market access for participating industries by:

- providing residue testing services that are technically sound, risk based and structured to meet market requirements within the specified budget; and
- providing scientific advice on residues and the management of residue-related issues.

The NRS is operated by the Australian Government Department of Agriculture, Fisheries and Forestry and is funded by levies on primary production by those industries that choose to participate in the Survey.

Industries participate in NRS residue monitoring projects to meet market access, export certification or national standards, or to assure customers of the quality of their product. NRS systematically monitors produce of participating industries, supporting the market access of Australian agricultural products to overseas countries by providing information on the residue status of exported product. The European Union (EU), USA and Canada, China, Japan, Taiwan, Russia and South Korea are among the major Australian export markets that require monitoring by the exporting country and also test imported produce in their own laboratories.

To be confident that produce meets the requisite standards, the reliability of the Australian analyses must be assured. The NRS laboratory performance evaluation (PE) system has been developed to provide that assurance, using a range of proficiency tests (PT) and other PE techniques in the selection of laboratories for NRS work.

Organisation and operation of NRS PT programs

NRS Residue Chemistry and Laboratory Performance Evaluation (RC-LPE) section

The NRS is a NATA accredited provider of proficiency tests and is recognised as complying with ISO\IEC 17043:2010 General requirements for proficiency testing.

The RC-LPE Section is responsible for all aspects of NRS laboratory performance evaluation and consists of:

Karina Budd	Director, RC-LPE
Susan Maddalena	Assistant Director, RC-LPE
Michelle Sleiman	Assistant Director, RC-LPE
Rohan Weragoda	Senior Project Officer, RC-LPE
Kartika Raju	Project Officer, RC-LPE
Rajeewa Malluwa Wadu	Project Officer, RC-LPE

Certain functions involved in the operation of the NRS PT programs are subcontracted to appropriately qualified and experienced service providers. These include the preparation of statistical data analysis, homogeneity and stability test sample analysis and advice from an advisory committee.

THE LPE COMMITTEE

The NRS PT / PE program is conducted with the advice of the NRS LPE Committee (see Appendix 1). This Committee is chaired by the Director of the NRS RC-LPE Section and comprises professional officers from the National Measurement Institute (NMI) and an independent chemical consultative organisation, with support from officers of the RC-LPE section.

ORGANISATION OF NRS PT

NRS PT arrangements depend on the classification of the program as either a Major Program or a Specialist Program. Major and Specialist Program PTs are scheduled at different times and are generally assessed via different methods.

NRS contract laboratories are required to participate in all relevant, scheduled PT conducted by the NRS for the entire contract term. Contract laboratories are also required to participate in the relevant round of PT held just prior to the commencement of a new contract term, to confirm performance before contract commencement.

Major Programs

Major Programs are those that regularly attract five or more participants and include the grain Programs 46 (when operating) and 49, and the animal Programs 8 and 16. Performance assessment in Major Program PT generally involves full statistical analysis of results and wherever possible involvement of the Laboratory Performance Evaluation (LPE) Committee (see PT performance assessment). Major Program PT rounds are generally conducted at six monthly intervals and participation is open to any laboratory (NRS operational constraints permitting).

The next scheduled rounds are as follows:

Round 58 PT – August 2023	(Pre-tender assessment round)
Round 59 PT – April 2024	(Performance verification for NRS contract laboratories prior to 13th term contracts commence)

Laboratories wishing to take part in Major program PT Rounds should register their interest by completing and forwarding the appropriate registration forms (provided separately), or by contacting an RC-LPE team member.

Note: Participation in Round 58 is a pre-requisite for laboratories wishing to tender for NRS 13th term contracts in the corresponding pesticide programs in meat and grain as well as all corresponding NRS metals contracts.

Round 59 in April 2024 is used for performance verification for NRS contract laboratories prior to commencement of 13th term contracts.

Specialist Programs (all other programs for which PT is available)

The Specialist Programs are those programs that, due to the nature of the analytes/matrix and/or the analytical method, attract only a small number of participants. Specialist Program PT is based on the NRS Inter-laboratory Check Sample Scheme (ILCSS). Performance assessment in Specialist Program PT involves the non-statistical method.

Separate Specialist Program PT may **not** be available for programs in honey or seafood and some programs in meat and grain (see Program specifications section of this handbook for

details). In those circumstances, other methods of performance evaluation will be used to assess laboratory capability (e.g. satisfactory results from international PT).

Specialist Meat Program PT rounds are generally conducted at four monthly intervals and participation is open to any laboratory (NRS operational constraints permitting).

Eligibility to tender for a Specialist Meat or Horticulture Program in the 13th contract term will generally require participation in the ONE relevant ILCSS round run between September – October 2023. Both the Specialist Meat Programs and the Horticulture Programs will comprise ONE set of samples which will be used for the assessment of laboratory performance. Results are assessed by the NRS LPE Committee.

Laboratories wishing to take part in the ILCSS should register their interest by completing and forwarding the appropriate registration forms (provided separately), or by contacting an RC-LPE team member.

Note: Participation in the ILCSS rounds between September – October 2023 is a prerequisite for laboratories wishing to tender for the NRS 13th term contracts in the corresponding Specialist Meat and Horticulture Programs.

The Specialist Meat Program ILCSS round in March 2024 is used for performance verification for NRS contract laboratories prior to commencement of 13th term contracts. Laboratories awarded NRS Specialist Horticulture Programs will not participate in a performance verification round of ILCSS testing.

Other PT programs for external clients

PT Programs developed to meet the needs of national industry bodies, i.e. residues in milk for Dairy Food Safety Victoria (DFSV) are run periodically. While participation in these PT programs is encouraged, awarding of contracts for the corresponding testing programs is the responsibility of the relevant industries.

PARTICIPATION IN PT

NRS contract laboratories are required to participate in all relevant, scheduled PT conducted by the NRS for the entire contract term. Contract laboratories are also required to participate in the relevant round of PT held just prior to the commencement of a new contract term to confirm preparedness to commence performance under contract.

Dates for scheduled PT rounds are available via the current NRS Proficiency Tests Schedule, available from RC-LPE staff.

Relevant participation for NRS contract laboratories – special cases

Metal programs:

In the case of NRS metals programs, participation in the relevant PT for metals will be a requirement for all laboratories contracted for the corresponding NRS metals contracts.

<u>Program 16: Metals in liver and eggs</u>
Participation in Program 16 PT will be required for laboratories contracted for:
Program 16: Metals in liver (including horse muscle samples)
Program 206: Metals in honey
Program 316: Metals in seafood

<u>Program 46: Metals in cereal grains, flour, bran, pulses and oilseeds</u>
This testing program and the PT program are currently suspended.

The testing program may be reinstated in the 12th contract term, however the PT program will not be reinstated at this time. If sample numbers increase significantly, NRS may reinstitute the PT program and the contract laboratory will be advised of mandatory participation.

Program 156: Metals in macadamia nuts, almonds, apples and pears, citrus and stonefruit
Where a PT program supports a NRS horticultural testing program, the PT is generally only run in the lead-up to the tender process (pre-tender PT) and one other time during the contract term, if that term is extended beyond 3 years.

PT type	Matrix of PT samples	NRS programs relevant to the PT	Elements included in the PT
Program 16	liver	16 (including horse muscle samples) 206, 316	mercury, lead, cadmium, selenium, zinc, arsenic (total), antimony, aluminium, chromium
Program 46 (when operating)	grain	46	mercury, lead, cadmium, arsenic (total), copper.
Program 156	assorted horticultural commodities	156	mercury, lead, cadmium, arsenic (total), copper

Accreditation

Accreditation by NATA (or international equivalent) is not a prerequisite for participation in any PT, however, NRS contract laboratories are required to have (or gain) accreditation for the relevant test method used in the delivery of contracted analytical services.

Methods of analysis

While methods are not prescribed and participating laboratories are free to use their method of choice in the PT, for NRS contract laboratories, the method used in the pre-tender and ongoing PT must be identical to the method to be used in the delivery of the contracted analytical service. This includes the identification of analytes consistent with the requirements as outlined at Section 1.2.4 in European Commission Decision 2021/808/EC https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32021R0808&from=EN.

The results reported by participants using various methods of analyses are not differentiated during the assessment processes. The LPE Committee may merely note differences in results generated via different methods of analyses and include such commentary in the relevant PT report. An estimation of measurement uncertainty should also be provided with the reported PT results (See also Appendix 4).

Confidentiality

The NRS recognises that laboratories involved in PT regard details of their participation as confidential. The confidentiality arrangements observed by the NRS in carrying out its PT programs are as follows:

- A laboratory's identity and assessment of its performance in any test remains confidential between the laboratory, the NRS and NATA or international equivalent accreditation body (see Appendix 2).

- To assist accreditation bodies gaining access to their accredited laboratories' PT results, accredited PT providers are encouraged to provide accreditation bodies with the assessment results of accredited participants in PT rounds. As an accredited proficiency testing provider routinely conducting proficiency testing schemes, the NRS may provide proficiency testing results reported by accredited participants to the relevant accreditation body - NATA mostly - once our proficiency testing programs are complete.

  Please note that by registering to participate in any NRS PT program, NRS assumes that laboratories consent to the provision of their performance assessment to the relevant accreditation body, unless the laboratory specifies otherwise.

The laboratory's specific results are identified in the report only by a letter code, randomly assigned for the particular test, to facilitate the processing and publication of results.

In discussions within the LPE Committee the same approach to confidentiality for particular laboratories will be observed with the exception that, for the proper discharge of its responsibility to adequately monitor the proficiency of laboratories at present performing analytical work under NRS contracts, all members of the LPE Committee may, if necessary, be aware of the performance achieved by the contracted laboratory in a test.

Cost

In order to develop a community of proficient laboratories from which analytical services may be obtained, the NRS fosters participation in the PT programs by absorbing PT program costs. Laboratories that habitually register their participation, receive PT samples and fail to report results within the deadline or at all will be excluded from further invitations to participate.

Overseas laboratories that are not current NRS contract laboratories but choose to participate in NRS PT programs, will be invoiced for the freight costs incurred by NRS for the transportation of PT samples. In addition, overseas laboratories participating in NRS PT programs run by NRS for external clients (e.g. milk), will be invoiced for the freight costs incurred by NRS for the transportation of PT samples. The milk client's contract laboratories will be excluded from this charge.

Overseas laboratories that require a phytosanitary certificate will be invoiced for the charges incurred by NRS for the preparation of such documentation.

PT schedule

The timing of registration, sample dispatch, reporting of results and assessment by the LPE Committee is publicised in the NRS Schedule of PT that is distributed with this Handbook and then generally six monthly thereafter to laboratories and other interested parties. PT reports are generally distributed to participants within two months of results due date.

Random audits

The NRS requires that a laboratory that takes part in its PT should be ready to substantiate any results that are submitted by the presentation of any relevant primary documentation. While such substantiation will generally be called up only occasionally, the laboratory should retain documentation of PT results for at least three years, in keeping with good laboratory practice. Since 1995, PT rounds have included random audits of test documentation. A laboratory's participation in the audit, if selected, is required where the laboratory is seeking

NRS contract work or seeking to be listed as 'satisfactory' for targeted testing by the Department of Agriculture, Fisheries and Forestry Meat Export Program.

PT performance assessment

The NRS laboratory performance assessment system aims to maintain an up-to-date and continuing assessment of the proficiency of laboratories analysing samples for the NRS, or seeking to offer such services in the future. This enables an objective evaluation of the laboratory competency for consideration together with other matters such as service, price and additional benefits, when analytical services are required on a contract basis. Performance in PT is an important aspect of laboratory performance evaluation for NRS.

Results in a particular PT are assessed, and laboratory performance classified, using a quantitative system developed by the NRS and confirmed by the LPE Committee.

HOW NRS PROFICIENCY TESTS ARE ASSESSED

There are two basic approaches used in the assessment and ranking of laboratory performance in PT:

The 'statistical approach' – used when sufficient numbers of laboratories participate in a given test (ideally ≥ 5) to allow full statistical analysis of results to be undertaken. The statistical approach to the assessment of results is based on result comparison to assigned values, where the assigned value is a consensus value calculated from participant results – the median. The statistical analysis is conducted by Proficiency Testing Australia (PTA), in accordance with ISO/IEC 13528:2015 'Statistical methods for use in proficiency testing by interlaboratory comparison' and the statistical interpretation is forwarded to the NRS RC-LPE section for assessment by the LPE Committee. This approach is generally applied to Major Program PT.

The 'non-statistical approach' – used when insufficient numbers of laboratories participate in a given test (generally < 5) to allow full statistical analysis of results to be undertaken. The basis of the assessment procedure, due to limited participant numbers, is an analyte-by-analyte comparison between reported results and the assigned values, i.e. spiked (expected) concentration values calculated from the formulation of the PT samples, unless the average or median is considered by the LPE Committee members to be more appropriate. This determination of assigned value is in accordance with ISO/IEC 13528:2015 'Statistical methods for use in proficiency testing by interlaboratory comparison'. In some instances where more than five laboratories participate in a test it may not be possible to conduct statistical analysis as some laboratories may not seek all analytes included in the test. The non-statistical approach is the primary technique used in the evaluation of results generated by laboratories participating in the horticulture, milk, specialist meat programs and honey and seafood programs, if run

Reporting of results to two significant figures

It is important that laboratories report results to two significant figures (e.g. 1.1, 0.11, 0.011, 0.0011, 0.00011) or that laboratories report to the number of significant figures justified by the uncertainty associated with a result.

Collation of results prior to assessment

Results from participants are generally received electronically on standard proformas provided by the RC-LPE section. All results can be transcribed electronically into the relevant PT reports or assessment formats. However, because the use of these proformas can

possibly result in transcription errors being made by participating laboratories, laboratories are permitted to also submit their results in their normal reporting format.

Where the participant has also provided results in their normal reporting format, a member of the RC-LPE section will cross-check both sets of results. If a discrepancy between the two sets of results is identified, the laboratory is contacted and requested to confirm the correct result. The confirmed result is then used in the assessment process.

In cases where NRS believes that a transcription error has been made by the laboratory when reporting results in the NRS format, NRS may request that the laboratory confirms the reported results, prior to any feedback being provided to the laboratory, and NRS will accept any corrected results submitted during this process.

Otherwise, in support of the consistent application of the accepted method of result assessment, all results reported in the standard Result Sheet proforma by laboratories, will be assessed by the LPE Committee on an 'as received' basis. The LPE Committee will not be informed of any correspondence undertaken between the laboratories and the NRS in relation to reported results unless it relates to a spiking concentration issue or other technical problem relating to the conduct of the PT.

Each participant is assigned a random laboratory identification code (generally a letter code) for their results. Throughout the assessment and ranking procedure the results are only referred to by this code and the participants' identity remains confidential between the laboratory, the RC-LPE section and NATA (or international equivalent). Laboratories are not identified to the LPE Committee.

For Major Programs, following collation and checking of results and prior to the assessment of results, each participating laboratory is sent feedback in the form of an interim report generally within two weeks of the laboratory reporting date, This report shows the laboratory's own results, the expected results and where applicable the median of all participants results. This gives participants the opportunity to check that results have been correctly attributed to their own laboratory and to provide comments prior to the assessment. In cases where the RC-LPE section may have incorrectly attributed results to a particular laboratory, RC-LPE will correct the error and use the correct results in the assessment process. In cases where the errors are attributable to the laboratory the results are assessed as received. Generally, the RC-LPE does not disclose assigned values until after results have been received from all PT participants, this ensures that no advantage can be gained from early disclosure by any participant.

The final report is generally provided to participants within 2 months of the laboratory reporting date.

Assessment of results – Statistical approach

Results collated into the appropriate format are provided electronically to Proficiency Testing Australia (PTA) for statistical analysis. PTA uses robust statistics to analyse results and provides summary statistics, including z-scores and combined z-scores, to the RC-LPE section for assessment by the LPE Committee. Target coefficients of variation (CVs) are set for each particular program prior to z-score analysis. The CVs are determined based, in part, on experience from previous rounds and NRS expectations in relation to analytical performance.

The LPE Committee firstly considers the z-scores generated for each individual analyte spiked in a given NRS program to determine whether the z-scores appropriately reflect the quality of the results reported. Once this process is complete, the combined z-scores, including penalties for false negatives, false positives and outliers (results for which the

|z-score| ≥ 3.0), are considered by the Committee when assessing laboratory performance and assigning gradings for the specific program. Participants are graded into the following categories:

- ***VERY GOOD***
- ***GOOD / VERY GOOD***
- ***GOOD***
- ***ADEQUATE / GOOD***
- ***ADEQUATE***
- ***UNSATISFACTORY***
- ***NOT ASSESSABLE*** (a laboratory that does not seek all analytes spiked in the round is classified as ***NOT ASSESSABLE*** for this round, unless it is a PT program provided for an external client who requests otherwise).

To be eligible to tender for an NRS contract, a laboratory is generally required to achieve a minimum performance level of ***ADEQUATE / GOOD*** in NRS PT and maintain or improve on this ranking in subsequent PT rounds.

Given that combined z-scores and total penalties are influenced by the number of analytes spiked as well as the spikes per analyte, it is not possible to directly compare the assignment of gradings from one PT round to another, based on the total penalties determined for each round. However, the total penalty scores and gradings assigned in previous rounds may be used to guide the decision making process.

The reported results may also be assessed against the expected values in cases where the assessment based on z-scores appears to be either too severe or lenient in grading laboratory performance according to the LPE Committee. An assessment of the reported results against the expected values may also be used to guide the grading of laboratory performance in cases where the total z-scores and penalties are at the interface between two grading levels. In such cases, the decision process used to grade laboratory performance is detailed in the relevant sections of the corresponding PT report.

Assessment of results – Non-statistical approach

Where the 'non-statistical' approach is used, results are provided to members of the LPE Committee for assessment. The basis of the assessment procedure is an analyte-by-analyte comparison between reported results and the spiked values (unless otherwise indicated). Classification of performance by this system considers:

- false negatives
- false positives
- outlier results
- transcription errors
- consistency in relationship between the expected and measured amounts of analyte, and
- relative consistency between participating laboratories and the spiked value.

A Reported versus Spiked (R/S) percentage value is calculated for each result. Once the %R/S values are calculated, a score is given for each result according to a pre-set range of values. While the scoring of laboratory performance may be more severe/lenient depending on the ease or difficulty of the analysis, the general scoring system used is as outlined below and based on the specified NRS LORs for the programs rather than the concentration range that analytes were spiked in an individual round.

Programs with specified NRS LORs >0.010mg/kg for all analytes

% Reported vs. Spiked
85 – 115
70 - 84 or 116 - 130
55 - 69 or 131 – 145
< 55 or > 145 (outliers)

Programs with specified NRS LORs ≤0.010mg/kg / metal horticulture programs / programs involving >20 analytes – comprising different chemical groups and using multi-residue method/PCBs/multiple isomer synthetic pyrethroids / analytes were analytical stability uncertainty is evident

% Reported vs. Spiked
85 – 115
65 - 84 or 116 - 135
40 - 64 or 136 – 160
< 40 or > 160 (outliers)

Multi-residue horticulture programs / programs involving analytes with known stability or analytical difficulties (e.g. herbicides in grain)

% Reported vs. Spiked
75 – 125
50 - 74 or 126 - 150
25 - 49 or 151 – 175
< 25 or > 175 (outliers)

While the scoring of laboratory performance may be more severe/lenient depending on the ease or difficulty of the analysis or analyte stability issues, the general ranking system used is consistent with the statistical approach. Hence where deemed appropriate by the LPE Committee members, the % Reported vs. Spiked range may be widened or the median value may be used instead of the spike.

The average score for each laboratory in the test is then calculated by adding the individual scores achieved for each reported result and dividing by the total number of spikes for all analytes. From this average score, gradings are provisionally allocated. The LPE Committee reviews the results, scores and provisional gradings. The Committee will then issue final gradings for each participant. The grading categories are the same as described for the statistical approach and a laboratory is generally required to achieve a minimum performance level of ***ADEQUATE / GOOD*** in NRS PT and maintain or improve on this ranking in subsequent PT rounds to be eligible for a NRS contract.

The LPE Committee has the authority to make judgements on any aspect of the assessment and ranking procedure including the exclusion of results from analysis where appropriate and the assignment of grades where scores are close to the boundary between grades.

Additional assessment parameters

A number of assessment parameters have been formulated by members of the LPE Committee for use in the assessment process where the treatment of reported results requires extraordinary consideration. These parameters are documented so that in all instances the same treatment of these reported results is ensured. The following assessment parameters are included as an example of how certain reporting practices may be considered in the assessment process.

Topic	Treatment of reported results
Degradation products reported e.g. DDT spike	DDT can degrade to DDE and DDD under the conditions of analysis if appropriate precautions are not taken. Significant conversion of DDT to DDE and/or DDD during analysis indicates poor analytical practice. For this reason if DDT is spiked into a sample and the laboratory also reports the presence of DDD and/or DDE, a penalty equivalent to an outlier is applied where the reported results for either DDD or DDE (or the combined result of DDD + DDE) are >10% of the DDT concentration reported by the laboratory.
Background metal levels	in cases where proficiency test samples contain background levels of metal elements specified for the program and a laboratory reports a result that is more than twice or less than half the median background level reported by all participating laboratories, the result is deemed an outlier and a background penalty equivalent to that of an outlier is applied.
Analyte instability	where an analyte stability issue is perceived / exists, members of the LPE Committee may deem the reported results to be satisfactory particularly if %R/S values may indicate analyte instability rather than poor laboratory performance

Possible use of PT results by other clients

The Department of Agriculture, Fisheries and Forestry Meat Export Program – recognition of laboratories for targeted testing programs

Performance in NRS PT also gives laboratories access to participate in analyses of the Department's 'targeted testing' programs. These programs involve specified pesticide and antimicrobial drug residue analyses, required to maintain Australia's export markets. Where such testing services may be offered to the market, laboratories that qualify are listed by the Department of Agriculture, Fisheries and Forestry Meat Export Program in a notice provided to relevant abattoirs. This notice is updated from time to time on the strength of performance in the most recent NRS PT.

National Organochlorine Residue Management (NORM) Program

Proficiency in NRS PT for a subset of the organochlorines (OC) of Fat matrix 2 - Program 8 – Pesticides in fat and eggs, supports laboratories being listed as eligible by the Department of Agriculture, Fisheries and Forestry Meat Export Program for the NORM Program. The OCs relevant to the NORM Program are: aldrin, dieldrin, chlordane (cis), chlordane (trans), oxychlordane, DDT (p,p'), DDT (o,p'), DDD (p,p'), DDE (p,p'), HCB, HCH-α, HCH-β, HCH-δ, HCH-γ, heptachlor and heptachlor epoxide. Consistent with NRS practice, for a laboratory to be considered to have demonstrated 'satisfactory' proficiency for the purposes of listing by the Department of Agriculture, Fisheries and Forestry Meat Export Program for targeted testing of pesticide residues it must have achieved an average performance grading of at least ***ADEQUATE / GOOD*** in the relevant NRS PT.

Laboratories wishing to gain the Department of Agriculture, Fisheries and Forestry Meat Export Program listing for the first time should contact a RC-LPE team member for further details.

Listing of eligible laboratories based on proficiency in NRS PT is reviewed after the completion of each PT round. A laboratory previously recognised as demonstrating 'satisfactory' performance will not be removed from the list on the grounds of poor performance (i.e. ***ADEQUATE*** in two consecutive rounds or ***UNSATISFACTORY*** in one round) without first being given the opportunity for a retest. If laboratory performance in such a retest is assessed at the ***GOOD*** (or better) level, the laboratory will remain listed.

National Antibacterial Residue Minimisation (NARM) Program

Proficiency in NRS Kidney matrix 1 PT for Program 1 – Antimicrobials in kidney, poultry livers, eggs and seafood, enables a laboratory to tender for NRS confirmatory testing in support of the Department of Agriculture, Fisheries and Forestry Meat Export NARM Program.

A microbial inhibition test (MIT) screen, conducted on urine, is the initial screening test used to detect antibacterial residues in calves in this program. Depending upon the arrangements adopted by the abattoir and the particular State, a urine screen positive may need to be followed up with confirmatory quantitative tests on tissue (kidney, liver or muscle) from the same carcase to determine the type and concentration of the antibacterial present in the tissue. This confirmatory analysis is performed by the approved laboratories listed on the relevant Departmental notice. The PT program for MIT in urine is also run by the NRS and currently involves one or two rounds of proficiency testing per calf season.

Industry has endorsed the principle of proficiency testing all laboratories conducting urine screening for the project, including all on-plant laboratories and provides funding for the MIT urine screen project which requires all export abattoirs participate and is encouraging further participation by domestic abattoirs.

How the Department of Agriculture, Fisheries and Forestry Meat Export Program receives PT assessment information

Where the Department of Agriculture, Fisheries and Forestry Meat Export Program lists laboratories currently eligible for export testing for particular residues, based on NRS PT performance, the NRS provides information on the following basis:

- the NRS informs the Department of Agriculture, Fisheries and Forestry Meat Export Program directly of changes in a relevant participant's proficiency eligibility;
- the NRS, after any particular PT or supplementary test, informs each laboratory that it meets the specified requirements for performance in the most recent tests. These

laboratories are notified of their status as currently demonstrating the required proficiency in the NRS tests; and

- the NRS does not comment on laboratories that do not currently meet the criteria for such recognition.

OTHER CLIENTS

Notification provided to participating laboratories, of their current performance ranking, is the property of the laboratory. While the laboratory is free to provide this record of standing to other clients, it should be noted that the particular specifications of the test, and the performance assessment, is based on NRS requirements and may not match the requirements of other clients (see Appendix 3).

NRS specifications and program development

NRS proficiency tests are evolving programs, with results, methodologies and sample presentations under constant review, with the aim of giving the best and most economical service for Australia's agricultural industries. We welcome comment about the effectiveness of the programs, including methodologies and definitions in the program and suggestions as to how the program may be improved. This Edition of the Handbook revises, in a number of respects, the specifications of some tests, following consultation with NRS program managers, industry and laboratories.

LIMIT OF DETECTION (LOD), LIMIT OF REPORTING (LOR) AND TRACE RESULTS

In the following program specifications, the listed NRS LOR is a limit set by NRS. Laboratories are encouraged to participate in NRS PT programs irrespective of whether they can meet the NRS LOR.

NRS would generally expect its contract laboratories' method LOD and LOR to be ≤ this NRS specified value.

NRS will publish quantitative results of residues detected in routine monitoring program samples for a particular commodity at concentrations ≥ the relevant NRS contract laboratories' LOR.

For NRS purposes, a laboratory's LOR must represent the lowest concentration of an analyte at which the laboratory can reliably confirm, quantify and report analytical results in a defined matrix using a specified analytical method.

For NRS purposes, the laboratory's LOD must represent the lowest concentration of an analyte at which positive identification can be achieved (e.g. according to the requirements outlined at Section 1.2.4 in European Commission Decision 2021/808/EC) in a defined matrix using a specific analytical method. LOD values are not listed by NRS in the PT program specifications given each laboratory's LOD values will depend upon their own method of analysis.

A 'trace' refers to the detection of an analyte at a concentration between the laboratory's method LOD and LOR at which positive identification can be achieved (e.g. according to the requirements outlined at Section 1.2.4 in in the European Commission Decision 2021/808/EC), but cannot be quantified with the same degree of certainty as detections at or above the laboratory's LOR. In certain circumstances, particularly in situations where laboratory LODs have been set at a conservative level, traces may also refer to analytes detected at values less than a laboratory's method LOD.

ADDITIONS AND CHANGES IN SPECIFICATION OF PROGRAMS IN THIS EDITION

Several established programs have been established, refined, reinstated or suspended since the previous edition of the Handbook. Please read carefully the specifications of the programs in which your laboratory is interested.

NRS PT program specifications

MEAT PT PROGRAMS

Program No	Program Name
PROGRAM 1	ANTIMICROBIALS in KIDNEY, POULTRY LIVERS, EGGS and SEAFOOD
MIT	MICROBIAL INHIBITION TEST (MIT) SCREEN for ANTIBACTERIALS in BOVINE URINE
PROGRAM 3	PHENICOLS in MUSCLE and SEAFOOD
PROGRAM 3E	PHENICOLS in EGGS
PROGRAM 4	NITROFURAN METABOLITES in EGGS and SEAFOOD
PROGRAM 4I	NITROFURAN METABOLITES in RETINA
PROGRAM 5A	NITROIMIDAZOLES in MUSCLE, EGGS and SEAFOOD
PROGRAM 5B	OLAQUINDOX, CARBADOX in LIVER
PROGRAM 6A	STILBENES, ZERANOLS and TRENBOLONE in LIVER
PROGRAM 6C	STILBENES, ZERANOLS and TRENBOLONE in FAECES
PROGRAM 7	BETA AGONISTS in LIVER
PROGRAM 8	PESTICIDES in FAT and EGGS
PROGRAM 10	CYROMAZINE, MELAMINE and DICYCLANIL in KIDNEY
PROGRAM 11	ANTHELMINTICS in LIVER
PROGRAM 12	OTHER ANTHELMINTICS in FAT and SEAFOOD
PROGRAM 15	TRICLABENDAZOLE in LIVER
PROGRAM 16	METALS in LIVER and EGGS
PROGRAM 18	DIOXINS in FAT
PROGRAM 20	ANDROGENIC SUBSTANCES in URINE
PROGRAM 23	NON STEROIDAL ANTI-INFLAMMATORY DRUGS (NSAIDS) in KIDNEY
PROGRAM 27	ANTICOCCIDIALS in LIVER and EGGS
PROGRAM 28	BENZOYL UREAS in FAT
PROGRAM 31	ACRYLONITRILE and VINYL CHLORIDE in EGGS
PROGRAM 32	INDICATOR PCBs in EGGS
PROGRAM 33	QUINOLONES and FLUOROQUINOLONES in KIDNEY
PROGRAM 35	CORTICOSTEROIDS in LIVER
PROGRAM 36	SEDATIVES in LIVER
PROGRAM 37	HERBICIDES in KIDNEY
PROGRAM 38	ANAESTHETICS IN FAT
PROGRAM 39	IMIDOCARB IN KIDNEY

Note 1: NRS uses random monitoring samples (of the major animal species) for multiple analyses where possible. The PT programs offered in support of the meat programs will reflect NRS' use of each sample matrix for a range of analyses for that particular matrix. As a result, the PT samples prepared in each matrix may contain analytes pertaining to more than one NRS meat program, i.e. Muscle matrix 1 PT samples will contain Program 3 and Program 5A analytes. NRS does not require laboratories to test for all analytes included in each PT matrix sample where a laboratory's interest is only in specific programs. Where a laboratory is interested in tendering for a specific NRS program (e.g. Program 5A), NRS requires that the laboratory covers all program analytes.

The combination of analytical programs to be included in the various PT matrix samples are listed below.

PT sample type	NRS Program covered by this matrix	PT program type	Matrix species of PT samples
Liver matrix 1	5B, 6A, 6C, 7	ILCSS	Ovine
Liver matrix 2	11	ILCSS	Ovine
Liver matrix 3	15, 27	ILCSS	Ovine
Liver matrix 4	35	ILCSS	Ovine
Liver matrix 5	16 (including horse muscle samples), 206, 316	Major Program	Ovine
Muscle matrix 1	3, 5A	ILCSS	Porcine
Kidney matrix 1	1	ILCSS	Ovine
Kidney matrix 2	10, 23	ILCSS	Ovine
Kidney matrix 3	33	ILCSS	Ovine
Kidney matrix 4	37	ILCSS	Ovine
Fat matrix 1	12, 28	ILCSS	Bovine
Fat matrix 2	8	Major Program	Bovine
Urine	20	ILCSS	Bovine

Where multiple programs' analytes are combined within PT matrix samples, the quantity of each PT matrix sample provided will be sufficient to allow for multiple laboratory methods to be conducted where required. A number of analytes will be included in each PT matrix sample and a number of PT matrix samples will be involved in each sample dispatch in order to cover the range of program analytes appropriately.

Note 2: We strive to provide a sufficient quantity of PT sample to allow the laboratory to quantify and confirm all analytes detected using their routine method of analysis. However if the amounts indicated in the following section are insufficient please contact the relevant NRS team member.

Note 3: Participation in Program 16 PT will be required for laboratories contracted for:
Program 16: Metals in liver, (including horse muscle samples)
Program 206: Metals in honey
Program 316: Metals in seafood

Note 4: Liver matrix 4 (Program 35) and Kidney matrix 3 (Program 33) samples will ONLY be run once a year, in the June ILCSS round.

Program 1: Antimicrobials in kidney, poultry livers, eggs and seafood

The NRS LOD values for eggs will generally be lower than those applicable to the other matrices.

ANALYTE	Kidney, Seafood and Poultry Livers		Eggs	
	NRS LOD Screening (mg/kg)	NRS LOD Confirming (mg/kg)	NRS LOD Screening (mg/kg)	NRS LOD Confirming (mg/kg)
AMINOGLYCOSIDES				
apramycin	0.25	0.25	0.050	0.050
dihydrostreptomycin	0.10	0.050	0.10	0.050
gentamycin	0.10	0.10	0.050	0.10
neomycin	0.10	0.050	0.050	0.050
streptomycin	0.10	0.050	0.010	0.050
BETA LACTAMS				
Penicillins				
amoxicillin	0.010	0.010	0.0050	0.010
ampicillin	0.010	0.0050	0.010	0.0050
benzyl G penicillin	0.010	0.010	0.010	0.010
cloxacillin	0.050	0.025	0.010	0.0050
Cephalosporins				
ceftiofur *(desfuroylceftiofur)*	0.20	0.10	0.10	0.10
cefuroxime	0.050	0.050	0.050	0.050
cephalonium	0.050	0.025	0.050	0.0050
MACROLIDES/LINCOSAMIDES				
erythromycin	0.10	0.050	0.050	0.050
lincomycin	0.10	0.050	0.050	0.050
oleandomycin	0.20	0.050	0.010	0.050
tilmicosin	0.20	0.10	0.010	0.050
tylosin	0.10	0.10	0.10	0.10
TETRACYCLINES				
(*Inhibitory substance, identified as chlortetracycline)*				
chlortetracycline	0.010	0.010	0.010	0.010
chlortetracycline *4-epichlortetracycline*	0.010	0.010	0.010	0.010
doxycycline	0.010	0.010	0.010	0.010
(*Inhibitory substance, identified as oxytetracycline)*				
oxytetracycline	0.010	0.010	0.010	0.010
oxytetracycline *4-epioxytetracycline*	0.010	0.010	0.010	0.010
(Inhibitory substance, identified as tetracycline)				
tetracycline	0.010	0.010	0.010	0.010
tetracycline *4-epitetracycline*	0.010	0.010	0.010	0.010

ANALYTE	Kidney		Eggs	
	NRS LOD Screening (mg/kg)	**NRS LOD Confirming (mg/kg)**	**NRS LOD Screening (mg/kg)**	**NRS LOD Confirming (mg/kg)**
TRIAMILIDES				
Sum of tulathromycin and its metabolites that are converted by acid hydrolysis to (2R, 3S, 4R, 5R, 8R, 10R, 11R, 12S, 13S, 14R)-2-ethyl-3,4,10,13-tetrahydroxy-3,5,8,10,12,14-hexamethyl-11-[[3,4,6-trideoxy-3-(dimethylamino)-ß-D-xylohexopyranosyl]oxy]-1-oxa-6-azacyclopentadecan-15-one, expressed as tulathromycin equivalents				
tulathromycin *tulathromycin (parent)*	0.30	0.15	0.10	0.10
SULFONAMIDES				
sulfachloropyridazine	0.020	0.020	0.020	0.020
sulfadiazine	0.020	0.020	0.010	0.020
sulfadimethoxine	0.020	0.020	0.020	0.020
sulfadimidine (sulfamethazine)	0.020	0.020	0.0025	0.020
sulfadoxine	0.020	0.020	0.020	0.020
sulfafurazole	0.020	0.020	0.020	0.020
sulfamerazine	0.020	0.020	0.020	0.020
sulfamethoxazole	0.020	0.020	0.020	0.020
sulfamethoxydiazine (sulfameter)	0.020	0.020	0.020	0.020
sulfamethoxypyridazine	0.020	0.020	0.020	0.020
sulfapyridine	0.020	0.020	0.020	0.020
sulfaquinoxaline	0.020	0.020	0.0050	0.020
sulfathiazole	0.020	0.020	0.020	0.020
sulfatroxazole	0.020	0.020	0.020	0.020
OTHERS				
avilamycin	0.10	0.10	0.050	0.050
virginiamycin	0.0050	0.0050	0.010	0.010
trimethoprim	0.020	0.020	0.010	0.010

Where technically possible, all analytes to be confirmed using instrumental analytical methods to the full residue definition. It is understood that this may not be possible for some analytes e.g. avilamycin, virginiamycin and the full residue definition of tulathromycin.

Specification of PT samples

The 2-3 Kidney matrix 1 samples per round will comprise approximately 60g of frozen, non-homogenised, spiked kidney packed frozen in polypropylene containers (replicate samples will be provided and blank matrix samples are available upon request). These kidney PT samples are only applicable to Program 1. The entire sample is to be thawed and homogenised by the laboratory, prior to analysis. The methods used must cover conjugated analytes where possible.

Microbial Inhibition Test (MIT) screen for antibacterials in bovine urine

ANALYTE	Indicative A Plate Screening LOD (mg/kg)	Indicative B Plate Screening LOD (mg/kg)
AMINOGLYCOSIDES		
dihydrostreptomycin		0.5
gentamycin		0.5
neomycin		0.25
streptomycin		0.5
BETA LACTAMS		
Penicillins		
amoxicillin	1.0	~1.0
ampicillin	0.5	~0.5
benzyl G penicillin	0.05	~0.2
cloxacillin	~1.8	~2.1
Cephalosporins		
ceftiofur *(desfuroylceftiofur)*	~0.4	~0.6
MACROLIDES/LINCOSAMIDES		
erythromycin	1.0	0.5
tilmicosin		1.4
tylosin	~0.8	0.5
TETRACYCLINES		
chlortetracycline	0.5	
doxycycline	~0.5	~1.0
oxytetracycline	0.5 - 1.4	
tetracycline	0.5	
SULFONAMIDES		
sulfadiazine	0.5	
sulfadimidine (sulfamethazine)	1.0	
sulfadoxine	~0.5	
sulfamerazine	1.8	
sulfatroxazole	~1.3	

Specification of PT samples

The 8-10 samples per round will comprise approximately 8mL of frozen, spiked urine packed in glass vacuum tubes. Two PT rounds are conducted per year, usually in March and August, coinciding with the calving seasons.

These urine PT samples are only applicable to the initial MIT screening in urine for the National Antibacterial Residue Minimisation (NARM) Program. PT samples should be tested using an approved, commercially available, single plate MIT screen – the Microtech A-plate produced by Merieux NutriSciences (MXNS), formerly Silliker Australia Pty Ltd, or the A-plate produced by Southern Scientific Services Pty Ltd. A-plate testing is required of abattoirs however, some additional testing may also be done using a B-plate (from either producer stated above) and/or a range of equivalent in-house multi-plate tests that allow the identification of the class of antibacterial present.

Program 3: Phenicols in muscle, seafood and casings

ANALYTE	NRS LOR (mg/kg)
chloramphenicol#	0.00010
florfenicol — *Sum of florfenicol and its metabolites florfenicol alcohol, florfenicol oxamic acid, monochloroflorfenicol and florfenicol amine expressed as florfenicol amine*	0.0030
thiamphenicol	0.0030

#Samples in the current PT program may be spiked with chloramphenicol and/or chloramphenicol glucuronide. The LOR relates to chloramphenicol as we1l as chloramphenicol glucuronide.

Note: The method used must cover both free and conjugated forms of all Program 3 analytes.

Note: The NRS LOR for muscle and seafood samples is shown above. The NRS LOR for casings may differ.

Specification of PT samples

The 2 - 4 Muscle matrix 1 samples per round will comprise approximately 50g of frozen, spiked, homogenised muscle packed in polystyrene containers. The muscle PT samples are applicable to Program 3 and Program 5A and each sample may contain analytes from either Programs 3 or 5A or both.

Program 3E: Phenicols in eggs

ANALYTE	NRS LOR (mg/kg)
chloramphenicol#	0.00010
florfenicol — *Sum of florfenicol and its metabolites florfenicol alcohol, florfenicol oxamic acid, monochloroflorfenicol and florfenicol amine expressed as florfenicol amine*	0.0030
thiamphenicol	0.0030

Note: The method used must cover both free and conjugated forms of all Program 3E analytes.

Specification of PT samples

PT will not be available for this program

Program 4: Nitrofuran metabolites in eggs and seafood

ANALYTE	NRS LOR (mg/kg)
1-aminohydantoin (AHD)	0.00050
3-amino-5-morpholinomethyl-1,3-oxazolidin-2-one (AMOZ)	0.00050
3-amino-2-oxazolidinone (AOZ)	0.00050
semicarbazide (SEM)	0.00050

Note: The test method used must cover both free and conjugated forms of the nitrofuran metabolites.

Specification of PT samples

PT will not be available for this program.

Program 4I: Nitrofuran metabolites in retina and casings

ANALYTE	NRS LOR (mg/kg)
1-aminohydantoin (AHD)	0.0020
3-amino-5-morpholinomethyl-1,3-oxazolidin-2-one (AMOZ)	0.0020
3-amino-2-oxazolidinone (AOZ)	0.0020
semicarbazide (SEM)	0.0020

Note: The test method used must cover both free and conjugated forms of the nitrofuran metabolites.

Note: The NRS LOR for beef retina samples is shown above. The acceptable LOR for retina of other species may differ given the different sized retinas involved and the NRS LOR applicable to casings may also differ.

Specification of PT samples

PT will not be available for this program.

Program 5A: Nitroimidazoles in muscle, eggs, seafood and casings

ANALYTE		NRS LOR (mg/kg)
dimetridazole	*Sum of*	
	dimetridazole (parent)	0.00010
	HMMNI▲ (as metabolite of dimetridazole)	0.00010
	expressed as dimetridazole	
ronidazole		
	ronidazole (parent)	0.00010
	HMMNI▲ (as metabolite of ronidazole)	0.00010
metronidazole		
	metronidazole	0.00010
	hydroxymetronidazole	0.00010

▲Dimetridazole and ronidazole break down very quickly (half-life of hours) to HMMNI (2-hydroxymethyl-1-methyl-5-nitroimidazole).

Specification of PT samples

The 2 - 4 Muscle matrix 1 samples per round will comprise approximately 50g of frozen, spiked, homogenised muscle in polystyrene containers. The muscle PT samples are applicable to Program 3 and Program 5A and each sample may contain analytes from either Programs 3 or 5A or both.

Program 5B: Olaquindox, carbadox in liver

ANALYTE		NRS LOR (mg/kg)
olaquindox	*Sum of olaquindox and all metabolites which reduce to 2-(N-2-hydroxyethylcarbamoyl)-3-methyl quinoxalone, expressed as olaquindox*	
	olaquindox marker residue: methyl-3-quinoxaline-2-carboxylic acid (MQCA)	0.0050
carbadox	*carbadox marker residue: quinoxaline-2-carboxylic acid (QCA)*	0.0050

Given that the marker residues for olaquindox and carbadox are methyl-3-quinoxaline-2-carboxylic acid (MQCA) and quinoxaline-2-carboxylic acid (QCA) respectively, the PT samples will be spiked with these marker residues.

Specification of PT samples

The 2 - 4 Liver matrix 1 samples per round will comprise approximately 50g of frozen, spiked, homogenised liver in polystyrene containers. These liver PT samples are applicable to Programs 5B, 6A, 6C and 7 and each sample may contain analytes from any or all of these programs.

Program 6A: Stilbenes, zeranols and trenbolone in liver

Program 6C: Stilbenes, zeranols and trenbolone in faeces

ANALYTE	NRS LOR (mg/kg)
STILBENES	
dienoestrol	0.00020
diethylstilboestrol	0.00020
hexoestrol	0.00020
ZERANOLS	
zeranol (alpha-zearalanol)	0.0020
taleranol (beta-zearalanol)	0.0020
zearalenol (alpha)	0.0020
zearalenol (beta)	0.0020
zearalenone	0.0020
zearalanone	0.0020
TRENBOLONE	
trenbolone acetate[#] *Sum of trenbolone acetate trenbolone (17-alpha) trenbolone (17-beta) both free and conjugated expressed as trenbolone*	0.00050 0.00050

Note: The method used must cover both free and conjugated forms of all program analytes.

Specification of PT samples

The 2 - 4 Liver 1 matrix samples per round will comprise approximately 50g of frozen, spiked, homogenised liver packed in polystyrene containers. These liver PT samples are applicable to Programs 5B, 6A, 6C and 7 and each sample may contain analytes from any or all of these programs.

Program 7: Beta-agonists in liver

ANALYTE	NRS LOR (mg/kg)
cimaterol	0.00030
clenbuterol	0.00030
mabuterol	0.00030
ractopamine	0.00030
salbutamol	0.0010
zilpaterol	0.00030

Note: The method used must cover both free and conjugated forms of all program analytes.

Specification of PT samples

The 2 - 4 Liver matrix 1 samples per round will comprise approximately 50g of frozen, spiked, homogenised liver packed in polystyrene containers. These liver PT samples are applicable to Programs 5B, 6A, 6C and 7 and each sample may contain analytes from any or all of these programs.

Program 8: Pesticides in fat and eggs

The NRS LOR listed apply to the fat matrix. NRS LOR in eggs will generally be lower, ideally 0.010 mg/kg.

ANALYTE	NRS LOR (mg/kg)
CARBAMATES	
carbaryl	
Sum of	
carbaryl	0.010
and conjugates, hydrolysed to carbaryl, expressed as carbaryl	
ORGANOCHLORINES	
aldrin^ and dieldrin^	
Sum of	
aldrin (HHDN)	0.020
dieldrin (HEOD)	0.020
chlordane^	
Sum of	
chlordane (cis)	0.020
chlordane (trans)	0.020
oxychlordane	0.020
DDT^	
Sum of	
DDT (p,p')	0.050
DDT (o,p')	0.050
DDE (p,p')	0.050
DDD (p,p ')	0.050
dicofol	
Sum of	
dicofol (p,p')	0.010
2,2,2-trichloro-1-(4-chlorophenyl)-1-(2-chlorophenyl) ethanol (dicofol (o,p'))	0.010
expressed as dicofol	
endosulfan	
Sum of	
endosulfan (alpha)	0.020
endosulfan (beta)	0.020
endosulfan sulfate	0.020
endrin	
Sum of	
endrin (parent)	0.010
delta-keto-endrin	0.010
HCB^ *(hexachlorobenzene)*	0.020
HCH *(BHC)*^ *Sum of isomers of 1,2,3,4,5,6-hexachlorocyclohexane other than lindane (gamma-HCH)*	
HCH (alpha)	0.020
HCH (beta)	0.020
HCH (delta)	0.020
heptachlor^	
Sum of	
heptachlor (parent)	0.020
*heptachlor epoxide***	0.020
lindane^ *(gamma-HCH)*	0.010
methoxychlor	0.020
mirex	0.020

ANALYTE	NRS LOR (mg/kg)
ORGANOPHOSPHATES	
chlorfenvinphos *Sum of E & Z isomers*	0.020
chlorpyrifos	0.010
chlorpyrifos-methyl	0.010
coumaphos *Sum of* *coumaphos (parent)* *coumaphos oxygen-analogue* *expressed as coumaphos*	 0.020 0.020
diazinon	0.020
dichlorvos	0.020
dimethoate *Sum of* *dimethoate* *omethoate (as a metabolite of dimethoate)* *expressed as dimethoate*	 0.020 0.020
ethion	0.020
famphur	0.020
famphur oxygen analogue	0.020
fenitrothion	0.020
fenthion *Sum of* *fenthion (parent)* *fenthion sulfoxide* *fenthion sulfone* *fenthion oxygen-analogue* *fenthion oxygen-analogue sulfoxide* *fenthion oxygen-analogue sulfone* *expressed as fenthion)*	 0.020 0.020 0.020 0.020 0.020 0.020
malathion (maldison)	0.010
methidathion	0.020
mevinphos	0.010
omethoate *(see also dimethoate)* *(n.b. in the absence of dimethoate, assume presence due to use of omethoate alone)*	0.020
parathion methyl	0.020
phosmet *Sum of* *phosmet (parent)* *phosmet oxygen-analogue* *expressed as phosmet*	 0.020 0.020
pirimiphos methyl	0.020
prothiofos	0.010
temephos *Sum of* *temephos (parent)* *temephos sulfoxide* *expressed as temephos*	 0.020 0.020
SYNTHETIC PYRETHROIDS	

ANALYTE	NRS LOR (mg/kg)
bifenthrin	0.020
bioresmethrin	0.020
cyfluthrin *Sum of isomers*	0.020
cyhalothrin *Sum of isomers*	0.020
cypermethrin *Sum of isomers*	0.020
deltamethrin	0.020
fenvalerate *Sum of isomers*	0.020
esfenvalerate	0.020
flumethrin *Sum of isomers*	0.020
permethrin *Sum of isomers*	0.020
tau-fluvalinate	0.010
CONTAMINANTS	
PCBs *(polychlorinated biphenyls)*	
Arochlor 1254	0.030
Arochlor 1260	0.030
pentachlorobenzene	0.020
FUNGICIDES	
amisulbrom	0.0050
azoxystrobin	0.010
benzovindiflupyr	**0.010**
bixafen *Commodities of animal origin: Sum of*	
bixafen (parent)	0.020
N-(3',4'-dichloro-5-fluorobiphenyl-2-yl)-3-(difluoromethyl)-1H-pyrazole-4-carboxamide (bixafen-desmethyl)	0.010
expressed as bixafen	
boscalid *Commodities of animal origin: Sum of*	
boscalid (parent)	0.010
2-chloro-N-(4'-chloro-5-hydroxybiphenyl-2-yl) nicotinamide	0.010
and the glucuronide conjugate of 2-chloro-N-(4'-chloro-5-hydroxybiphenyl-2-yl) nicotinamide	
expressed as boscalid equivalents	
carbendazim *Sum of*	
carbendazim (parent)	0.010
2-aminobenzimadazole	0.010
expressed as carbendazim	
cyproconazole	0.020
difenoconazole	0.010
epoxiconazole	0.010
fenhexamid	**0.010**
fenpyrazamine	0.010
fludioxonil *Commodities of animal origin: Sum of*	
fludioxonil (parent)	0.010
and oxidisable metabolites	
expressed as fludioxonil	
fluopicolide	0.0050

ANALYTE	NRS LOR (mg/kg)
fluopyram *Commodities of animal origin: Sum of* *fjuopyram (parent)* *2-(trifluoromethyl) benzamide and the combined residues of N-{(E)-2-[3-chloro-5-(trifluoromethyl)pyridin-2-yl]ethenyl}-2-(trifluoromethyl) benzamide and N-{(Z)-2-[3-chloro-5-(trifluoromethyl)pyridin-2-yl]ethenyl}-2-(trifluoromethyl) benzamide* *expressed as fluopyram*	 0.010 0.010
fluquinconazole	0.010
flutriafol	0.020
fluxapyroxad	0.010
imazalil	0.0050
isofetamid ***Sum of*** ***isofetamid (parent)*** ***and 2-[3-methyl-4-[2-methyl-2-(3-methylthiophene-2-carboxamido)propanyl]phenoxy] propanoic acid (PPA)*** ***expressed as isofetamid***	 **0.010**
isopyrazam	0.010
mandestrobin	0.010
mefentrifluconazole	**0.010**
procymidone	0.020
propamocarb *propamocarb (base)*	0.0050
propiconazole	0.020
proquinazid ***Sum of*** ***proquinazid (parent)*** ***and 3-(6-iodo-4-oxo-3-propyl-3H-quinazolin-2-yloxy) propionic acid*** ***expressed as proquinazid***	 **0.010**
prothioconazole *Commodities of animal origin: Sum of* *prothioconazole (parent)* *prothioconazole desthio (2-(1-chlorocyclopropyl)-1-(2-chlorophenyl)-3-(1H-1,2,4-triazol-1-yl)-propan-2-ol)* *prothioconazole-3-hydroxy-desthio or alternative name prothioconazole-3-hydroxy-desthio (2-(1-chlorocyclopropyl)-1-(2-chloro-3-hydroxyphenyl)-3-(1H-1,2,4-triazol-1-yl)-propan-2-ol)* *prothioconazole-4-hydroxy-desthio or alternative name prothioconazole-4-hydroxy-desthio (2-(1-chlorocyclopropyl)-1-(2-chloro-4- hydroxyphenyl)-3-(1H-1,2,4-triazol-1-yl)-propan-2-ol)* *expressed as prothioconazol*	 0.020 0.020 0.020 0.020
pydiflumetofen	
pyraclostrobin *Commodities of animal origin: Sum of* *pyraclostrobin* *and metabolites hydrolysed to 1-(4-chloro-phenyl)-1-H-pyrazol-3-ol* *expressed as pyraclostrobin*	 0.010
pyrimethanil	0.010
pyriofenone	0.0050
quinoxyfen	0.010
quintozene *Sum of* *quintozene (parent)* *pentachloroaniline* *methyl pentachlorophenyl sulphide* *expressed as quintozene*	 0.020 0.020 0.020

ANALYTE	NRS LOR (mg/kg)
spiroxamine *Commodities of animal origin: spiroxamine carboxylic acid*	
spiroxamine (parent)	0.010
tebuconazole	0.010
trifloxystrobin *Sum of*	
trifloxystrobin (parent)	0.010
and its acid metabolite ((E,E)-methoxyimino-[2-[1-(3-trifluoromethylphenyl)-ethylideneaminooxymethyl]phenyl] acetic acid),	0.010
expressed as trifloxystrobin equivalents	
HERBICIDES	
amicarbazone *Sum of*	
amicarbazone	0.010
N-(1,1-dimethylethyl)-4,5-dihydro-3-(1-methylethyl)-5-oxo-1H-1,2,4-triazole-1-carboxamide	0.010
N-(1,1-dimethylethyl)-4,5-dihydro-3-(1-hydroxy-1-methylethyl)-5-oxo-1H-1,4,4-triazole-1-carboxamide	0.010
expressed as amicarbazone	
cinmethylin	**0.010**
cloquintocet acid *Sum of*	
cloquintocet mexyl (parent)	0.010
5-chloro-8-quinolinoxyacetic acid	0.010
expressed as cloquintocet mexyl	
ethofumesate	0.020
florpyrauxifen-benzyl *Sum of*	
florpyrauxifen-benzyl	0.010
and the XDE-848 acid metabolite [4-amino-3-chloro-6-(4-chloro-2-fluoro-3-methyoxyphenyl)-5-fluoropyridine-2-carboxylic acid]	0.010
expressed as florpyrauxifen-benzyl	
indaziflam	0.010
metamitron	0.010
metazachlor *Commodities of animal origin: Sum of metazachlor and its metabolites containing the 2,6-dimethylaniline moiety, expressed as metazachlor*	
metazachlor (parent)	0.010
2,6-dimethylaniline	0.15
2-[(2,6-dimethylphenyl)(1H-pyrazol-1-ylmethyl)amino}-2-oxoethanesulfonic acid (metazachlor ESA)	0.010
2-[2,6-dimethyl-N-(pyrazole-1-ylmethyl)aniline]-2-oxoacetic acid (metazachlor OXA)	0.020
metolachlor	0.020
propachlor *Sum of propachlor and metabolites hydrolysable to N-isopropylaniline, expressed as propachlor*	
propachlor (parent)	0.020
N-isopropylaniline	0.020
pyrasulfotole *Sum of*	
pyrasulfotole (parent)	0.010
pyrasulfotole desmethyl or alternative name (5-hydroxy-3-methyl-1H-pyrazol-4-yl)[2-mesyl-4-(trifluoromethyl)phenyl]methanone	0.010
expressed as pyrasulfotole	
pyroxsulam	0.0050
saflufenacil *Commodities of animal origin: saflufenacil*	0.0050
topramezone	0.010

ANALYTE	NRS LOR (mg/kg)
trifludimoxazin	**0.010**
INSECTICIDES	
acequinocyl ***Sum of***	
acequinocyl (parent)	**0.010**
and its metabolite 2-dodecyl-3-hydroxy-1,4-naphthoquinone	**0.010**
expressed as acequinocyl	
acetamiprid *Commodities of animal origin: Sum of*	
acetamapirid (parent)	0.010
N-demethyl acetamiprid ((E)-N1-[(6-chloro-3-pyridyl)methyl]-N2-cyanoacetamidine	0.010
expressed as acetamiprid	
afidopyropen *Commodities of animal origin: Sum of*	
Afidopyropen	0.012
the carnitine conjugate of cyclopropane carboxylic acid (M4401060)	
expressed as afidopyropen	
buprofezin	**0.010**
chlorantraniliprole	0.010
chlorfenapyr	0.020
clothianidin	0.010
cyantraniliprole	0.0050
cyclaniliprole	0.010
diafenthiuron *Sum of*	
diafenthiuron (parent)	0.010
N-[2,6-bis(1-methylethyl)- 4-phenoxyphenyl]-N'-(1,1-dimethylethyl)urea and	0.010
N-[2,6-bis(1-methylethyl)-4-phenoxyphenyl]- N'-(1,1-dimethylethyl) carbodiimide,	0.010
expressed as diafenthiuron	
dinotefuran *Commodities of animal origin: Sum of*	
dinotefuran (parent)	0.030
1-methyl-3-(tetrahydro-3-furylmethyl)-urea (UF)	
expressed as dinotefuran	
etofenprox	**0.010**
fipronil *Sum of*	
fipronil (parent)	0.010
fipronil - sulfenyl metabolite	0.010
fipronil - sulfonyl metabolite	0.010
fipronil trifluoromethyl metabolite	0.010
flonicamid *Commodities of animal origin: Sum of*	
flonicamid (parent)	0.010
TFNA-AM (4-trifluoromethylnicotinamide)	0.010
expressed as flonicamid	
flubendiamide *Commodities of animal origin: Sum of*	
flubendiamide (parent)	0.010
3-iodo-N-(2-methyl-4-[1,2,2,2-tetrafluoro-1-(trifluoromethyl)ethyl]phenyl)phthalimide	0.010
expressed as flubendiamide	

ANALYTE		NRS LOR (mg/kg)
fluensulfone		0.010
flupyradifurone		0.010
fluralaner		**0.010**
imidacloprid	*Sum of imidacloprid and metabolites containing the 6-chloropyridinylmethylene moiety, expressed as imidacloprid*	
	imidacloprid (parent)	0.010
	imidacloprid-olefin	0.010
	imidacloprid-5-hydroxy metabolite	0.010
indoxacarb	*Sum of indoxacarb and its R-isomer*	0.020
metaflumizone		0.010
pyraclofos		0.020
pyriproxyfen		**0.010**
spirotetramat	*Sum of spirotetramat,*	0.010
	cis-3-(2,5-dimethylphenyl)-4-hydroxy-8-methoxyl-1-azaspiro[4.5]dec-3-en-2-one	0.020
	expressed as spirotetramat	
sulfoxaflor		0.010

** laboratories should be aware that heptachlor epoxide exists as two isomers (exo and endo). Samples in the current PT programs will be spiked with the exo isomer.
^ analyte relevant to the NORM program

Note: The analytes shown in bold in the table above have been added to Program 8 testing and may be included in PT samples from January 2023.

Specification of PT samples

The 6-8 Fat matrix 2 samples per round will comprise approximately 20g of frozen, spiked, homogenised fat, packed in glass vials. There will be a maximum of six analytes per PT sample. All NRS fat PT samples will have been rendered on preparation and should be analysed on an 'as received' basis. (see Appendix 4).

Program 10: Cyromazine, melamine and dicyclanil in kidney

ANALYTE	NRS LOR (mg/kg)
cyromazine	0.010
melamine	0.010
dicyclanil *Sum of*	
dicyclanil (parent)	0.010
triaminopyridyl metabolite	0.010
expressed as dicyclanil	

Specification of PT samples

The 2 – 4 Kidney matrix 2 samples per round will comprise approximately 50g of frozen, spiked, homogenised kidney packed in polystyrene containers. These kidney PT samples are applicable to Program 10 and Program 23 and each sample may contain analytes from either Programs 10 or 23 or both.

Program 11: Anthelmintics in liver

ANALYTE	NRS LOR (mg/kg)
albendazole *Sum of*	
albendazole (parent)	0.0020
albendazole sulfoxide	0.0020
albendazole sulfone	0.0020
albendazole sulfone amine	0.0020
expressed as albendazole	
clorsulon	0.080
closantel	0.050
fenbendazole	0.0010
fenbendazole sulfone	0.0010
flubendazole ***Sum of***	
flubendazole (parent)	**0.0010**
2-amino-1 H-benzimidazole-5-yl 4-fluorophenyl methanone	
expressed as flubendazole	
levamisole	0.0010
mebendazole	0.0050
mebendazole, 5-hydroxy-	0.0050
morantel	0.0010
nitroxynil	0.012
oxfendazole (fenbendazole sulfoxide)	0.0010
oxibendazole	0.0010
oxyclozanide	0.0050
parbendazole	**0.0010**
rafoxanide	**0.010**
thiabendazole *Sum of*	
thiabendazole (parent)	0.010
5-hydroxythiabendazole	0.010
expressed as thiabendazole	

Note: The analytes shown in bold in the table above have been added to Program 11 testing and may be included in PT samples from January 2023.

Specification of PT samples

The 2 - 4 Liver matrix 2 samples per round will comprise approximately 50g of frozen, spiked, homogenised liver packed in polystyrene containers. Liver matrix 2 samples will include all analytes as displayed above, including those analytes previously included in Programs 13 and 14 where those programs operated separately. Programs 13 and 14 will be suspended as separate programs.

Note: The method used must cover both free and conjugated forms of thiabendazole and 5-hydroxythiabendazole.

Program 12: Macrocyclic lactones, spinosyns and other anthelmintics in fat and seafood

ANALYTE	NRS LOR (mg/kg)
abamectin *(avermectin B1a)*	0.0050
derquantel	0.0010
doramectin	0.0050
emamectin *Sum of emamectin B1a emamectin B1b*	0.0020
eprinomectin *(eprinomectin B1a)*	0.0050
ivermectin *(H2B1a)*	0.0050
milbemectin *Sum of milbemycin MA3 and milbemycin MA4 and their photoisomers, milbemycin (Z) 8.9-MA3 and (Z) 8,9-MA4*	0.010
monepantel *(monepantel sulfone)*	0.0050
moxidectin	0.0050
praziquantel	0.0050
spinetoram *Sum of ethyl-spinosyn J (major) ethyl-spinosyn L (minor)*	0.0050 0.0050
spinosad *Sum of spinosyn A spinosyn D*	0.0050 0.0050

Specification of PT samples

The 2 - 4 Fat matrix 1 samples per round will comprise approximately 25g of frozen, spiked, homogenised fat packed in glass vials. The fat PT samples are applicable to Program 12 and Program 28 and each sample may contain analytes from either Programs 12 or 28 or both. All NRS fat PT samples will have been rendered on preparation and should be analysed on an 'as received' basis (see Appendix 4).

Program 15: Triclabendazole in liver

ANALYTE	NRS LOR (mg/kg)
triclabendazole▲ *Sum of triclabendazole and metabolites oxidisable to keto-triclabendazole expressed as keto-triclabendazole equivalents*	0.050

▲ To cover the residue definition the method must involve an extraction procedure to liberate all bound metabolites and an oxidation step to convert these to the keto-triclabendazole form.

Specification of PT samples

The 2 - 4 Liver matrix 3 samples per round will comprise approximately 50g of frozen, spiked, homogenised liver in polystyrene containers. These liver PT samples are applicable to Program 15 and Program 27 and each sample may contain analytes from either Programs 15 or 27 or both.

Program 16: Metals in liver and eggs

The NRS LOR listed apply to the liver matrix. NRS LOR in eggs will generally be lower, ideally 0.0050 mg/kg.

ANALYTE	NRS LOR (mg/kg) Relevant to NRS Programs 16 (including horse muscle samples)	NRS LOR (mg/kg) Relevant to NRS Programs 206 (Honey)	NRS LOR (mg/kg) Relevant to NRS Programs 316 (Seafood)
arsenic (As) (total)	0.050		0.050
cadmium (Cd)	0.010		0.010
lead (Pb)	0.010	0.010	0.010
mercury (Hg)	0.010		0.010
antimony (Sb)	0.010		0.010
chromium (Cr)			0.050
aluminium (Al)		0.50	
selenium (Se)		0.050	
zinc (Zn)		0.050	

Note: A number of horse muscle samples will be tested for those elements specified in Program 16. The Liver matrix 5 PT samples relating to Program 16 will be applicable for these horse muscle testing too.

Specification of PT samples

The 4-6 Liver matrix 5 samples per round will comprise approximately 25g of frozen, spiked, homogenised liver packed in polystyrene containers.
Although only As, Cd, Pb, Hg and Sb are specified for Program 16, PT relating to Program 16 will encompass those elements relevant to cover the PT requirements for the other animal metal programs as well, i.e. PT samples will include all elements listed in the table above.

See *'Relevant participation for NRS contract laboratories – special cases'*, section for more information.

Note: Participation in Program 16 PT will be required for laboratories contracted for Programs 16 (including horse muscle samples), 206, and 316.

Program 18: Dioxins in fat

ANALYTE	NRS LOR (mg/kg)
polychlorinated dibenzo-p-dioxins (PCDDs) and dibenzofurans (PCDFs) and 'dioxin-like' PCBs	variable

Specification of PT samples

PT will not be available for this program.

Program 20: Androgenic substances in urine

ANALYTE	NRS LOR (mg/kg)
boldenone (17 alpha-)	0.0010
boldenone (17 beta-)	0.0010
methandriol	0.0050
19-nortestosterone (17 alpha-) [*or epinandrolone*]	0.0010
19-nortestosterone (17 beta-) [*or nandrolone*]	0.0010
stanozolol	0.0010
16-hydroxystanozolol	0.0010

Specification of PT samples

The 2-3 samples per round will comprise approximately 30-40mL of frozen, spiked urine packed in glass containers. These urine PT samples are only applicable to Program 20.

Note: The method used must cover both free conjugated forms of all program analytes. The analytical method for the laboratory contracted for this program must also be able to quantify the sulfate conjugated form for boldenone (17 alpha-) and boldenone (17 beta-).

Program 23: Non-steroidal anti-inflammatory drugs (NSAIDs) in kidney

ANALYTE	NRS LOR (mg/kg)
flunixin	0.010
ketoprofen	0.010
oxyphenbutazone	0.0050
phenylbutazone	0.0050
tolfenamic acid	0.0050
meloxicam	0.0050

Specification of PT samples

The 2 - 4 Kidney matrix 2 samples per round will comprise approximately 50g of frozen, spiked, homogenised kidney packed in polystyrene containers. These kidney PT samples are applicable to Program 10 and Program 23 and each sample may contain analytes from either Programs 10 or 23 or both.

Note: The method used must cover both free and conjugated forms of flunixin.

Program 27: Anticoccidials in liver and eggs

ANALYTE	Liver	Eggs
	NRS LOR (mg/kg)	NRS LOR (mg/kg)
amprolium	0.010	0.010
decoquinate	0.0020	0.0020
diclazuril	0.010	0.0020
halofuginone	0.010	0.0020
lasalocid	0.010	0.010
maduramicin	0.0020	0.0020
monensin	0.010	0.010
narasin	0.010	0.0020
nicarbazin *(4,4'-dinitrocarbanilide (DNC))*	0.010	0.010
salinomycin	0.0020	0.0020
semduramycin	0.0020	0.0020
toltrazuril *Sum of toltrazuril (parent)*	0.010	0.010
toltrazuril sulfoxide	0.010	0.010
toltrazuril sulfone	0.010	0.010
expressed as toltrazuril		

Specification of PT samples

The 2 - 4 Liver matrix 3 samples per round will comprise approximately 50g of frozen, spiked, homogenised liver packed in polystyrene containers. These liver PT samples are

applicable to Program 15 and Program 27 and each sample may contain analytes from either Programs 15 or 27 or both.+

Program 28: Benzoyl ureas in fat

ANALYTE	NRS LOR (mg/kg)
chlorfluazuron	0.010
diflubenzuron	0.010
fluazuron	0.010
novaluron	0.010
triflumuron	0.010

Specification of PT samples

The 2 - 4 Fat matrix 1 samples per round will comprise approximately 25g of frozen, spiked, fat, packed in glass vials. The fat PT samples are applicable to Program 12 and Program 28 and each sample may contain analytes from either Programs 12 or 28 or both. All NRS fat PT samples will have been rendered on preparation and should be analysed on an 'as received' basis (see Appendix 4).

Program 31: Acrylonitrile and vinyl chloride in eggs

ANALYTE	NRS LOR (mg/kg)
acrylonitrile	0.010
vinyl chloride	0.0050

Specification of PT samples

PT will not be available for this program.

Program 32: Indicator PCBs in eggs

ANALYTE	NRS LOR (mg/kg)
PCB#101	0.0000010
PCB#138	0.0000010
PCB#153	0.0000010
PCB#180	0.0000010
PCB#28	0.0000010
PCB#52	0.0000010

Specification of PT samples

PT will not be available for this program.

Program 33: Quinolones and fluoroquinolones in kidney

ANALYTE	NRS LOR (mg/kg)
ciprofloxacin	0.0050
danofloxacin	0.0050
difloxacin	0.0050
enrofloxacin	0.0050
flumequine	0.0050
gatifloxacin	0.0050
levofloxacin	0.0050
lomefloxacin	0.0050
marbofloxacin	0.0050
moxifloxacin	0.0050
nalidixic acid	0.0050
norfloxacin	0.0050
orbifloxacin	0.0050
oxolinic acid	0.0050
sarafloxacin	0.0050

Specification of PT samples

The 2-3 Kidney matrix 3 samples per round will comprise approximately 60g of frozen, non-homogenised, spiked kidney packed frozen in polypropylene containers (replicate samples will be provided). The kidney PT samples are only applicable to Program 33. The entire sample is to be thawed and homogenised by the laboratory, prior to analysis.

Note: Kidney matrix 3 (Program 33) samples will ONLY be run once a year, in the June ILCSS round.

Program 35: Corticosteroids in liver

ANALYTE	NRS LOR (mg/kg)
betamethasone	0.0010
dexamethasone	0.0010
flumethasone	0.0010
methylprednisolone	0.0010
triamcinolone	0.0010
triamcinolone acetonide	0.0010

Specification of PT samples

The 2 - 4 Liver matrix 4 samples per round will comprise approximately 50g of frozen, spiked, homogenised liver packed in polystyrene containers. These liver PT samples are only applicable to Program 35.

Note: The method used must cover both free conjugated forms of all program analytes.

Note: Liver matrix 4 (Program 35) samples will ONLY be run once a year, in the June ILCSS round.

Program 36: Sedatives in liver

ANALYTE	NRS LOR (mg/kg)
acepromazine	0.0010
azaperone	0.0010
carazolol	0.0010
chlorpromazine	0.0050
propionyl promazone	0.0010
xylazine	0.0010

Specification of PT samples

PT will not be available for this program.

Program 37: Herbicides in kidney

ANALYTE	NRS LOR (mg/kg)
HERBICIDES	
2,2-DPA *(2,2-dichloropropionic acid)*	0.30
2,4-D	0.030
amitrole	0.010
atrazine	0.015
bixlozone	**0.010**
bromacil	0.015
bromoxynil	0.050
carfentrazone-ethyl	0.020
chlormequat	0.010
chlorpropham	0.010
chlorsulfuron	0.025
chlorthal-dimethyl	0.015
clethodim *(n.b. residues arising from the use of clethodim are covered by the MRLs for sethoxydim)*	
clethodim (parent)	0.020
clodinafop-propargyl	0.020
clopyralid	0.34
cyanazine	0.020
dicamba	1.3
dichlobenil	0.010
dichlorprop-P *Sum of dichlorprop acid, its esters and conjugates, hydrolysed to dichlorprop acid, and expressed as dichlorprop acid*	0.025
diclofop-methyl	0.010
diflufenican	0.020
diuron *Sum of*	
diuron (parent)	0.020
3,4-dichloroaniline (as metabolite of diuron)	0.015
expressed as diuron	
diquat *(diquat cation)*	0.020
Sum of fenoxaprop-ethyl (all isomers) and 2-(4-(6-chloro-2-benzoxazoyloxy)phenoxy)-propanoate and 6-chloro-2,3-dihydrobenzoxazol-2-one, expressed as fenoxaprop-ethyl	
fenoxaprop-ethyl *fenoxaprop-ethyl (sum of isomers)*	0.015
flamprop-M-methyl	0.010
fluazifop-p-butyl *Sum of fluazifop-butyl, fluazifop and their conjugates) expressed as fluazifop*	0.025
flumetsulam	0.010
fomesafen	**0.010**

ANALYTE	NRS LOR (mg/kg)
glufosinate *Sum of*	
glufosinate-ammonium	0.010
N-acetyl glufosinate	0.010
3-[hydroxy(methyl)-phosphinoyl]propionic acid	0.010
expressed as glufosinate (free acid)	
glyphosate *Sum of*	
N-acetyl glyphosate	
glyphosate (parent)	0.010
aminomethylphosphonic acid (AMPA)	0.010
expressed as glyphosate	
haloxyfop *Sum of haloxyfop, its esters and conjugates expressed as haloxyfop*	0.010
imazamox	0.025
imazapic	0.010
imazapyr	0.015
imazaquin	0.015
imazethapyr	0.020
iodosulfuron-methyl	0.015
ioxynil	0.020
ipconazole	0.020
isoxaben	0.020
linuron *Sum of*	
linuron (parent)	0.020
3,4-dichloroaniline	0.015
expressed as linuron	
MCPA	0.015
mesotrione	**0.010**
methabenzthiazuron	0.010
metosulam	0.020
metribuzin	0.020
metsulfuron-methyl	0.020
napropamide	0.020
norflurazon	0.015
oryzalin	0.040
paraquat *(paraquat cation)*	0.010
pendimethalin	0.040
picloram	0.040
propyzamide	0.015
quizalofop-ethyl *Sum of quizalofop acid and other esters, expressed as quizalofop-ethyl*	
quizalofop-ethyl (parent)	0.010
quizalofop free acid (quizalofop-ethyl metabolite)	0.010

ANALYTE	NRS LOR (mg/kg)
quizalofop-P-tefuryl *Sum of quizalofop-P-tefuryl and quizalofop acid, expressed as quizalofop-P-tefuryl*	
quizalofop-P-tefuryl (parent)	0.010
quizalofop-P-tefuryl metabolite	0.010
sethoxydim *Sum of sethoxydim and metabolites containing the 5-(2-ethylthiopropyl)cyclohexene-3-one and 5-(2-ethylthiopropyl)-5-hydroxycyclohexene-3-one moieties and their sulfoxides and sulfones, expressed as sethoxydim*	
sethoxydim (parent)	0.010
simazine	0.020
tetraniliprole	**0.010**
tiafenacil ***Sum of***	
tiafenacil (parent)	**0.010**
and 3-(2-(2-chloro-4-fluoro-5-(3-methyl-2,6-dioxo-4-(trifluoromethyl)-2,3-dihydropyrimidin-1(6H)-yl) phenylthio)propanamido) propanoic acid (M-01)	
expressed as tiafenacil	
tralkoxydim	0.13
triasulfuron	0.030
triclopyr	0.040
trifluralin	0.010

Note: The analytes shown in bold in the table above have been added to Program 37 testing and may be included in PT samples from January 2023.

Specification of PT samples

The 2 - 3 Kidney matrix 4 samples per round will comprise approximately 60g of frozen, spiked, homogenised kidney packed in polypropylene containers

Program 38: Anaesthetics in fat

ANALYTE	NRS LOR (mg/kg)
2,6-dimethylaniline	0.020
4-acetamidobenzoic acid	0.020
4-aminobenzoic acid	0.020
benzocaine	0.0050
bupivacaine	0.0050
bupivacaine-desbutyl	0.020
fentanyl	0.0050
glycinexylidide	0.020
lignocaine (lidocaine)	0.0050
mepivacaine	0.0050
norlidocaine	0.020
procaine	0.0050
xylazine	0.0050

Specification of PT samples

PT will not be available for this program.

Program 39: Imidocarb in kidney

ANALYTE	NRS LOR (mg/kg)
imidocarb	0.010

Specification of PT samples

PT will not be available for this program.

GRAIN PT PROGRAMS

Program No	Program Name
PROGRAM 42	PHOSPHINE in CEREAL GRAINS, FLOUR, BRAN, PULSES and OILSEEDS
PROGRAM 46	METALS in CEREAL GRAINS, FLOUR, BRAN, PULSES and OILSEEDS
PROGRAM 49	MULTI-RESIDUE PESTICIDE SCREEN in CEREAL GRAINS, FLOUR, BRAN, PULSES and OILSEEDS
PROGRAM 49H	HERBICIDES in CEREAL GRAINS, FLOUR, BRAN, PULSES and OILSEEDS, MACADAMIA NUTS and ALMONDS
PROGRAM 49I	IMIDAZOLINONE HERBICIDES in CEREAL GRAINS, PULSES and OILSEEDS

Note 1: Cereal grains include: wheat, barley, kibble, maize, oats, polenta, sorghum, triticale
Pulses include: beans (faba/broad, navy, mung), peas (chick, cow, field, pigeon peas), lentils, lupins, vetch
Oilseeds include: canola, sunflower, linseed, soybean, safflower

Note 2: The PT program for Program 46: Metals in cereal grains, flour, bran, pulses and oilseeds is currently suspended.
For the beginning of the 12th contract term the testing program was reinstated, however, the PT program was not reinstated. If sample numbers increase significantly, NRS may reinstitute the PT program and the contract laboratory will be advised of mandatory participation.

For the beginning of the 12th contract term, a separate testing program and PT program for metals in horticultural matrices was instituted as Program 156, refer to the Horticulture PT programs section below.

Note 3: A separate NRS testing program for phosphine in almonds operates as Program 142 to that NRS testing program for phosphine in cereal grains, flour, bran , pulses and oilseeds, Program 42. PT will not be available for either Program 42 nor Program 142.

Program 42: Phosphine in cereal grains, flour, bran, pulses and oilseeds

ANALYTE	NRS LOR (mg/kg)
phosphine *Sum of phosphine (absorbed) phosphide (unreacted)* expressed as hydrogen phosphide (phosphine)*	0.0050

* Unreacted phosphide reported as mg/kg phosphine (PH_3)

The residue definition for phosphine = all phosphides, expressed as hydrogen phosphide (phosphine). The method used must be capable of determining both the absorbed phosphine and unreacted phosphide levels.

Specification of PT Samples

PT will not be available for this program.

Program 46: Metals in cereal grains, flour, bran, pulses and oilseeds

ANALYTE	NRS LOR (mg/kg)
arsenic (As) (total)	0.050
cadmium (Cd)	0.010
copper (Cu)	0.050
lead (Pb)	0.010
mercury (Hg)	0.010

Specification of PT Samples

PT will not be available for this program.

Program 49: Multi-residue pesticide screen in cereal grains, flour, bran, pulses and oilseeds

ANALYTE	NRS LOR (mg/kg)
CARBAMATES	
aldicarb *Sum of* *aldicarb (parent)* *aldicarb sulfoxide* *aldicarb sulfone* *expressed as aldicarb*	 0.010 0.010 0.010
carbaryl	0.010
carbofuran *Sum of* *carbofuran (parent)* *3-hydroxycarbofuran* *expressed as carbofuran*	 0.010 0.010
carboxin	0.010
carboxin sulfoxide	0.010
chlorpropham	0.010
fenoxycarb	0.010
methiocarb *Sum of* *methiocarb (parent)* *methiocarb sulfoxide* *methiocarb sulfone* *expressed as methiocarb*	 0.010 0.010 0.010
methomyl	0.010
pirimicarb *Sum of* *pirimicarb (parent)* *demethyl-pirimicarb* *demethylformamido-pirimicarb* *expressed as pirimicarb*	 0.010 0.010 0.010
thiodicarb *Sum of* *thiodicarb (parent)* *methomyl (as thiodicarb metabolite)* *expressed as thiodicarb*	 0.010 0.010
FUNGICIDES	
azoxystrobin	0.010
benalaxyl	0.010
benomyl *(see carbendazim)* *(n.b. residues arising from the use of benomyl are covered by MRLs for carbendazim)*	
benzovindiflupyr	**0.010**
bitertanol	0.010
bixafen	0.010
boscalid	0.010

ANALYTE	NRS LOR (mg/kg)
bupirimate	0.010
captafol	0.020
captan	0.010
carbendazim *Sum of carbendazim (parent) 2-aminobenzimadazole expressed as carbendazim*	0.010 0.010
chlorothalonil	0.010
cyproconazole *Sum of isomers*	0.010
cyprodinil	0.010
difenoconazole	0.010
dimethomorph *Sum of E & Z isomers*	0.010
dithianon	0.010
dodine	0.010
epoxiconazole	0.010
etridiazole	0.010
fenarimol	0.010
fenbuconazole	0.010
fenhexamid	0.010
fluazinam	0.010
fludioxonil	0.010
fluopicolide	**0.010**
fluopyram	**0.010**
fluquinconazole	0.010
flusilazole	0.010
flutriafol	0.010
fluxapyroxad	0.010
hexaconazole	0.010
imazalil	0.010
iprodione	0.010
isoprothiolane	0.010
isopyrazam	**0.010**
kresoxim methyl	0.010
metalaxyl	0.010
myclobutanil	0.010
oxadixyl	0.010
penconazole	0.010
penflufen	0.010

ANALYTE	NRS LOR (mg/kg)
prochloraz	
Sum of prochloraz and its metabolites containing the 2,4,6-trichlorophenol moiety, expressed as prochloraz	
prochloraz	0.010
2,4,6-trichlorophenol	0.010
procymidone	0.010
propiconazole	0.010
prothioconazole	
Sum of	
prothioconazole (parent)	0.010
prothioconazole desthio (2-(1-chlorocyclopropyl)-1-(2-chlorophenyl)-3-(1H-1,2,4-triazol-1-yl)-propan-2-ol)	0.010
expressed as prothioconazole	
pyraclostrobin	0.010
pydiflumetofen	**0.010**
pyrimethanil	0.010
quinoxyfen	0.010
quintozene	
Sum of	
quintozene (parent)	**0.010**
pentachloroaniline	**0.010**
methylpentachlorophenyl sulfide	**0.010**
expressed as quintozene	
spiroxamine	0.010
tebuconazole	0.010
thiabendazole	0.010
triadimefon	
Sum of	
triadimefon (parent)	0.010
triadimenol (as triadimefon metabolite)	0.010
expressed as triadimefon	
triadimenol	
(n.b. in the absence of triadimefon, assume presence due to use of triadimenol alone)	0.010
trifloxystrobin	
Sum of	
trifloxystrobin (parent)	0.010
trifloxystrobin acid metabolite ((E,E)-methoxyimino-[2-[1-(3-trifluoromethylphenyl)-ethylideneaminooxymethyl]phenyl] acetic acid)	**0.010**
expressed as trifloxystrobin equivalents	
triticonazole	0.010
vinclozolin	0.010
ORGANOCHLORINES	
aldrin and dieldrin	
Sum of	
aldrin (HHDN)	0.010
dieldrin (HEOD)	0.010
chlordane	
Sum of	
chlordane (cis)	0.010
chlordane (trans)	0.010

ANALYTE	NRS LOR (mg/kg)
DDT *Sum of*	
DDT (p,p')	0.010
DDT (o,p')	0.010
DDE (p,p')	0.010
DDD (p,p ')	0.010
dicofol *Sum of*	
dicofol (p,p')	0.010
2,2,2-trichloro-1-(4-chlorophenyl)-1-(2-chlorophenyl) ethanol (dicofol (o,p'))	0.010
expressed as dicofol	
endosulfan *Sum of*	
endosulfan (alpha)	0.010
endosulfan (beta)	0.010
endosulfan sulfate	0.010
endrin *Sum of*	
endrin	0.010
delta-keto-endrin	0.010
HCB *(hexachlorobenzene)*	0.010
HCH *(BHC)* *Sum of isomers of 1,2,3,4,5,6-hexachlorocyclohexane other than lindane (gamma-HCH)*	
HCH (alpha)	0.010
HCH (beta)	0.010
HCH (delta)	0.010
heptachlor *Sum of*	
heptachlor (parent)	0.010
*heptachlor epoxide***	0.010
lindane *(gamma-HCH)*	0.010
ORGANOPHOSPHATES	
acephate	0.010
azamethiphos	0.010
azinphos-methyl	0.010
cadusafos	0.010
chlorfenvinphos *Sum of E and Z isomers*	0.010
chlorpyrifos	0.010
chlorpyrifos-methyl	0.010
diazinon	0.010
dichlorvos	0.010
dimethoate *(see also omethoate)* *Sum of*	
dimethoate (parent)	0.010
omethoate (as dimethoate metabolite)	0.010
expressed as dimethoate	

ANALYTE	NRS LOR (mg/kg)
disulfoton	
Sum of	
disulfoton (parent)	0.010
demeton-S	0.010
disulfoton sulfoxide	0.010
disulfoton sulfone	0.010
demeton-S sulfoxide	0.010
demeton-S sulfone	0.010
expressed as disulfoton	
ethion	0.010
ethoprofos	0.0050
fenamiphos	
Sum of	
fenamiphos (parent)	0.010
fenamiphos sulfoxide	0.010
fenamiphos sulfone	0.010
expressed as fenamiphos	
fenitrothion	0.010
fenthion	
Sum of	
fenthion (parent)	0.010
fenthion sulfoxide	0.010
fenthion sulfone	0.010
fenthion oxygen-analogue	0.010
fenthion oxygen-analogue sulfoxide	0.010
fenthion oxygen-analogue sulfone	0.010
expressed as fenthion	
malathion (maldison)	0.010
methacrifos	0.010
methamidophos	0.010
methidathion	0.010
mevinphos	0.010
monocrotophos	0.010
omethoate *(see also dimethoate)* *(n.b. in the absence of dimethoate, assume presence due to use of omethoate alone)*	0.010
parathion (parathion-ethyl)	0.010
parathion-methyl	0.010
phorate	
Sum of	
phorate (parent)	0.010
phorate sulfoxide	0.010
phorate sulfone	0.010
phorate oxygen analogue	0.010
phorate oxygen analogue sulfoxide	0.010
phorate oxygen analogue sulfone	0.010
expressed as phorate	

ANALYTE		NRS LOR (mg/kg)
phosmet	*Sum of*	
	phosmet (parent)	0.010
	phosmet (oxygen-analogue)	0.010
	expressed as phosmet	
pirimiphos-methyl		0.010
profenofos		0.010
prothiofos		0.010
terbufos	*Sum of*	
	terbufos (parent)	0.010
	terbufos sulfone	0.010
	terbufos sulfoxide	0.010
	terbufos oxygen analogue	0.010
	tebufos oxygen analogue sulfone	**0.010**
	terbufos oxygen analogue sulfoxide	**0.010**
	expressed as terbufos	
tolclofosmethyl		0.010
triazofos		0.010
trichlorfon		0.010
SYNTHETIC PYRETHROIDS		
bifenthrin		0.010
bioresmethrin		0.010
cyfluthrin	*Sum of isomers*	0.010
cyhalothrin	*Sum of isomers*	0.010
cypermethrin	*Sum of isomers*	0.010
deltamethrin		0.010
fenvalerate		0.010
	esfenvalerate	0.010
permethrin	*Sum of isomers*	0.010
phenothrin	*Sum of (+)cis- and (+)trans- isomers*	0.010
tau-fluvalinate		0.010
INSECTICIDES / ACARICIDES		
abamectin	*avermectin B1a*	0.010
bifenazate	*Sum of*	
	bifenazate (parent)	0.010
	bifenazate diazene	0.010
	expressed as bifenazate	
buprofezin		0.010
chlorantraniliprole		0.010
chlorfenapyr		0.010
clofentezine		0.010
clothianidin		0.010

ANALYTE	NRS LOR (mg/kg)
cyantraniliprole	0.010
dinotefuran	**0.010**
emamectin	
Sum of	
emamectin B1a	0.010
emamectin B1b	
etoxazole	0.010
fenbutatin oxide *(bis[tris(2-methyl-2-phenylpropyl)tin]-oxide)*	0.010
fenpyroximate	0.010
fipronil	
Sum of	
fipronil (parent)	0.0020
fipronil sulfenyl metabolite	0.0020
fipronil sulfonyl metabolite	0.0020
fipronil trifluoromethyl metabolite	0.0020
flonicamid	
Sum of	
flonicamid (parent)	0.010
TFNG (N-(4-trifluoromethylnicotinoyl)glycine)	0.010
TFNA (4-trifluoromethylnicotinic acid)	0.010
expressed as flonicamid	
fluensulfone	**0.010**
flupyradifurone	**0.010**
hexythiazox	0.010
imidacloprid	
Sum of imidacloprid and metabolites containing the 6-chloropyridinylmethylene moiety, expressed as imidacloprid	
imidacloprid (parent)	0.010
imidacloprid-olefin	0.010
imidacloprid-5-hydroxy	0.010
indoxacarb *Sum of indoxacarb and its R-isomer*	0.010
methoprene *Sum of cis- and trans- isomers*	0.010
methoxychlor	0.010
methoxyfenozide	0.010
mirex	0.010
propargite	0.010
pymetrozine	0.010
pyrethrins	
Sum of	
pyrethrin I	0.010
pyrethrin II	0.010
cinerin I	
cinerin II	0.010
jasmolin I	
jasmolin II	0.010
determined after calibration by means of the International Pyrethrum Standard)	

ANALYTE	NRS LOR (mg/kg)
pyriproxyfen	0.010
spinetoram *Sum of* *ethyl-spinosyn J (major)* *ethyl-spinosyn L (minor)*	 0.010 0.010
spinosad *Sum of* *spinosyn A* *spinosyn D*	 0.010 0.010
spirotetramat *Sum of* *spirotetramat (parent)* *cis-3-(2,5-dimethylphenyl)-4-hydroxy-8-methoxy-1-azaspiro[4.5]dec-3-en-2-one,* *expressed as spirotetramat*	 0.010 0.010
sulfoxaflor	0.010
tebufenozide	0.010
tebufenpyrad	0.010
tetradifon	0.010
thiacloprid	0.010
thiamethoxam	0.010
OTHER PESTICIDES	
acetamiprid	0.010
amitraz *Sum of* *amitraz (parent)* *N-(2,4-dimethylphenyl)-N '-methylformamidine* *expressed as N-(2,4-dimethylphenyl)- N'- methylformamidine*	 0.010 0.010
diafenthiuron *Sum of* *diafenthiuron* *N-[2,6-bis(1-methylethyl)- 4-phenoxyphenyl]-N'-(1,1-dimethylethyl)urea and* *N-[2,6-bis(1-methylethyl)-4-phenoxyphenyl]- N'-(1,1-dimethylethyl)carbodiimide,* *expressed as diafenthiuron*	 0.010 0.010
diflubenzuron	0.010
piperonyl butoxide	0.010
sedaxane *Sum of isomers*	0.010
triflumuron	0.010
HERBICIDES	
2,2-DPA *(2,2-dichloropropionic acid)*	0.010
2,4-D	0.010
2,4-DB	0.010
acifluorfen	0.010
ametryn	0.010
aminopyralid *Sum of aminopyralid and conjugates, expressed as aminopyralid*	0.010
atrazine	0.010
bentazone	0.010

ANALYTE	NRS LOR (mg/kg)
bicyclopyrone *Sum of* *bicyclopyrone (parent)* *and its structurally related metabolites determined as the common moieties SYN503780* *and CSCD68648* *expressed as bicyclopyrone*	 0.010 0.010
bixlozone	**0.010**
bromacil	0.010
bromoxynil	0.010
butafenacil	**0.010**
butroxydim	0.010
carfentrazone-ethyl	0.010
chlorsulfuron	0.010
chlorthal-dimethyl	0.010
cinmethylin	**0.010**
clethodim *(n.b. residues arising from the use of clethodim are covered by the MRLs for sethoxydim)* *clethodim (parent)*	 0.010
clodinafop acid *(R)-2-[4-95-chloro-3-fluoro-2-pyridinyloxy) phenoxy] propanoic acid*	0.010
clodinafop-propargyl	0.010
clomazone	0.010
clopyralid	0.010
cloquintocet-mexyl *Sum of* *cloquintocet mexyl (parent)* *5-chloro-8-quinolinoxyacetic acid* *expressed as cloquintocet mexyl*	 0.010
cyanazine	0.010
dicamba	0.010
dichlobenil	0.010
diflufenican	0.010
dimethenamid-P *Sum of* *dimethenamid-P and its (R)-isomer*	 0.010
diuron *Sum of* *diuron (parent)* *3,4-dichloroaniline (as metabolite of diuron)* *expressed as diuron*	 0.010 0.010
EPTC *(ethyldipropylthiocarbamate)*	0.010
ethofumesate	0.010
fenoxaprop-ethyl *Sum of fenoxaprop-ethyl (all isomers) and 2-(4-(6-chloro-2-benzoxazoyloxy)phenoxy)-propanoate and 6-chloro-2,3-dihydrobenzoxazol-2-one, expressed as fenoxaprop-ethyl* *fenoxaprop-ethyl (sum of isomers)*	 0.010

ANALYTE	NRS LOR (mg/kg)
florasulam	0.010
florpyrauxifen-benzyl	**0.010**
flumetsulam	0.010
flumioxazin	0.010
fluroxypyr	0.010
fomesafen	**0.010**
halauxifen-methyl	0.010
halosulfuron-methyl	0.010
iodosulfuron-methyl	0.010
ioxynil	0.010
ipconazole	0.010
isoxaben	0.010
isoxaflutole *Sum of*	
isoxaflutole (parent)	0.010
2-cyclopropylcarbonyl-3-(2-methylsulfonyl-4-trifluromethylphenyl)-3-oxopropanenitrile	0.010
expressed as isoxaflutole	
linuron *Sum of*	
linuron (parent)	0.010
3,4-dichloroaniline	0.010
expressed as linuron	
MCPA	0.010
MCPB	0.010
mefenpyr-diethyl *Sum of*	
mefenpyr-diethyl (parent)	0.010
and metabolites hydrolysed to 1-(2,4-dichloropohenyl)-5-methyl-2-pyrazoline-3,5-dicarboxylic acid	
and 1-(2,4-dichlorophenyl)-5-methyl-pyrazole-3-carboxylic acid	
expressed as mefenpyr-diethyl	
mesotrione	**0.010**
metazachlor *Sum of metabolites*	
479M04 (N-(2,6-dimethylphenyl)-N-(1H-pyrazol-1-ylmethyl)oxalamide), called OXA metabolite	0.010
479M08 (N-(2,6-dimethylphenyl)-N-(1H-pyrazol-1-ylmethyl)aminocarbonylmethylsulfonic acid), called ESA metabolite	0.010
479M16 (3-[N-(2,6-dimethylphenyl)-N-(1H-pyrazol-1-ylmethyl)aminocarbonylmethylsulfinyl]-2-hydroxypropanoic acid), called PRO metabolite	0.010
expressed as metazachlor	
methabenzthiazuron	0.010
metamitron	**0.010**
metolachlor	0.010
metosulam	0.010

ANALYTE	NRS LOR (mg/kg)
metribuzin	0.010
metsulfuron-methyl	0.010
napropamide	0.010
norflurazon	0.010
oryzalin	0.010
oxyfluorfen	0.010
pendimethalin	0.010
picloram	0.010
picolinafen	0.010
pinoxaden *Sum of* *free and conjugated M4 metabolite, 8-(2,6-diethyl-4-hydroxymethylphenyl)-tetrahydro-pyrazolo[1,2-d][1,4,5]oxa-diazepine-7,9-dione* *expressed as pinoxaden* *pinoxaden (parent)*	0.010
prometryn	0.010
propachlor *Sum of propachlor and metabolites hydrolysable to N-isopropylaniline, expressed as propachlor* *propachlor (parent)* *N-isopropylaniline*	0.010 0.010
propyzamide	0.010
prosulfocarb	0.010
pyraflufen-ethyl *Sum of* *pyraflufen-ethyl (parent) and its acid metabolite (2-chloro-5-(4-chloro-5-difluoromethoxy-1-methylpyrazol-3-yl)-4-fluorophenoxyacetic acid)*	0.010
pyrasulfotole *Sum of* *pyrasulfotole (parent)* *pyrasulfotole desmethyl or alternate name 5-hydroxy-3-methyl-1H-pyrazol-4-yl)[2-mesyl-4-(trifluoromethyl)phenyl]methanone* *expressed as pyrasulfotole*	0.010 0.010
pyroxasulfone *Sum of* *pyroxasulfone (parent)* *(5-difluoromethoxy-1-methyl-3-trifluoromethyl-1H-pyrazol-4-yl)methanesulfonic acid* *expressed as pyroxasulfone*	0.010 0.010
pyroxsulam	0.010

ANALYTE	NRS LOR (mg/kg)
saflufenacil *Sum of* *saflufenacil* *N'-{2-chloro-4-fluoro-5-[1,2,3,6-tetrahydro-2,6-dioxo-4-(trifluoromethyl)pyrimidin-1-yl]benzoyl-N-isopropyl sulfamide and* *N-[4-chloro-2-fluoro-5-({[(isopropylamino)sulfonyl]amino}carbonyl)phenyl]urea, expressed as saflufenacil equivalents*	 0.010 0.010 0.010
sethoxydim *Sum of sethoxydim and metabolites containing the 5-(2-ethylthiopropyl)cyclohexene-3-one and 5-(2-ethylthiopropyl)-5-hydroxycyclohexene-3-one moieties and their sulfoxides and sulfones, expressed as sethoxydim* *sethoxydim (parent)*	 0.010
simazine	0.010
sulfosulfuron *Sum of* *sulfosulfuron (parent)* *and its metabolites which can be hydrolysed to 2-(ethylsulfonyl)imidazo[1,2-a]pyridine* *expressed as sulfosulfuron*	 0.010
terbuthylazine	0.010
terbutryn	0.010
tiafenacil	**0.010**
topramezone	**0.010**
tralkoxydim	0.010
triallate *Sum of* *triallate (parent)* *2,3,3-trichloroprop-2-ene sulfonic acid (TCPSA),* *expressed as triallate*	 0.010
triasulfuron	0.010
tribenuron-methyl	0.010
triclopyr	0.010
trifludimoxazin	**0.010**
trifluralin	0.010
PHYSIOLOGICAL MODIFIERS	
forchlorfenuron	**0.010**
prohexadione-calcium ***Sum of***	
free prohexadione (parent)	**0.010**
and conjugated forms of prohexadione	
expressed as prohexadione	
trinexapac-ethyl *trinexapac acid* *trinexapac-ethyl (parent)* *trinexapac acid (unconjugated)*	 0.010 0.010

** laboratories should be aware that heptachlor epoxide exists as two isomers (exo and endo). Samples in the current PT programs will be spiked with the exo isomer.

Note: The analytes shown in bold in the table above have been added to Program 49 testing and may be included in PT samples from January 2023.

Specification of PT Samples

The 8 samples per round will comprise approximately 150g of spiked grain packed in glass jars. Residue definition analytes to be reported individually (see Appendix 4). These samples may contain analytes from Program 49I analytes also (see below).

Program 49H: Herbicides in cereal grains, flour, bran, pulses and oilseeds, macadamia nuts and almonds

ANALYTE	NRS LOR (mg/kg)
HERBICIDES	
amitrole	0.010
chlormequat	0.010
dichlorprop-P — *Sum of dichlorprop acid, its esters and conjugates, hydrolysed to dichlorprop acid, and expressed as dichlorprop acid*	0.010
diclofop-methyl	0.010
diquat — *(diquat cation)*	0.010
flamprop-M-methyl	0.010
fluazifop-p-butyl — *Sum of fluazifop-butyl, fluazifop and their conjugates) expressed as fluazifop*	0.010
glufosinate — *Sum of glufosinate-ammonium N-acetyl glufosinate 3-[hydroxy(methyl)-phosphinoyl]propionic acid expressed as glufosinate (free acid)*	0.010
glyphosate — *Sum of N-acetyl glyphosate glyphosate (parent)*	0.010
aminomethylphosphonic acid (AMPA) expressed as glyphosate	0.010
haloxyfop — *Sum of haloxyfop, its esters and conjugates expressed as haloxyfop*	0.010
paraquat — *(paraquat cation)*	0.010
propaquizafop — *Propaquizafop and acid and oxophenoxy metabolites, measured as 6-chloro-2-methoxyquinoxaline, expressed as propaquizafop*	0.010
quizalofop-ethyl — *Sum of quizalofop acid and other esters, expressed as quizalofop-ethyl*	0.010
quizalofop-P-tefuryl — *Sum of quizalofop-P-tefuryl and quizalofop acid, expressed as quizalofop-P-tefuryl*	0.010

Specification of PT Samples

The 4 samples per round will comprise approximately 150g of spiked grain packed in glass jars.

Note: Where possible, the method used should cover both free and conjugated forms of all program analytes in order to satisfy the residue definitions as close as possible.

Program 49I: Imidazolinone herbicides in cereal grains, pulses and oilseeds

ANALYTE	NRS LOR (mg/kg)
imazamox	0.010
imazapic	0.010
imazapyr	0.010
imazaquin	0.010
imazethapyr	0.010

Specification of PT Samples

PT for this program will be covered by Program 49 PT.

HORTICULTURE PT PROGRAMS

Program No	**Program Name**
Macadamia nuts, Almonds, Apples and Pears	
PROGRAM 142	PHOSPHINE in ALMONDS
PROGRAM 156	METALS in MACADAMIA NUTS, ALMONDS, APPLES and PEARS
PROGRAM 157	MICROBIOLOGY in APPLES and PEARS
PROGRAM 169	MULTI RESIDUE PESTICIDE SCREEN including DITHIOCARBAMATES in MACADAMIA NUTS, ALMONDS, APPLES and PEARS
PROGRAM 179	PATULIN in APPLE and PEAR JUICE

Where a PT program supports a NRS horticultural testing program, the PT is generally only run in the lead-up to the tender process (pre-tender PT) and one other time during the contract term, if that term is extended beyond 3 years.

Note 1: Program 169 represents a multi-residue screen as one combined analytical program and program samples currently consist of macadamia nuts, almonds, apples and pears.
Other commodities may be added to the testing program in the future. The suite of analytes covered by the horticultural multi-residue screen program is listed below.

The PT programs offered in support of the NRS horticultural multi-residue pesticide testing program will be prepared in macadamia nut and/or apple or pear matrices.

PT samples for the horticultural multi-residue program will not include dithiocarbamates.

Note 2: A separate NRS testing program for phosphine in almonds operates as Program 142 to that NRS testing program for phosphine in cereal grains, flour, bran , pulses and oilseeds, Program 42. PT will not be available for either Program 42 nor Program 142..

Program 142: Phosphine in almonds

ANALYTE	NRS LOR (mg/kg)
phosphine *Sum of phosphine (absorbed) phosphide (unreacted)* expressed as hydrogen phosphide (phosphine)*	0.0050

* Unreacted phosphide reported as mg/kg phosphine (PH_3)

The residue definition for phosphine = all phosphides, expressed as hydrogen phosphide (phosphine). The method used must be capable of determining both the absorbed phosphine and unreacted phosphide levels.

Specification of PT Samples

PT will not be available for this program.

Program 156: Metals in macadamia nuts, almonds, apples and pears

ANALYTE	NRS LOR (mg/kg)
arsenic (As) (total)	0.050
cadmium (Cd)	0.010
copper (Cu)	0.050
lead (Pb)	0.010
mercury (Hg)	0.010

Specification of PT Samples

The 4-6 samples per round will comprise approximately 10g of frozen, spiked, homogenised macadamia nuts and/or apples or pears and/or citrus packed in glass jars (replicates will be provided). This is to be thawed and the entire sample extracted for analysis.

Program 157: Microbiology in apples and pears

TEST SPECIFICS	
TT Faecal Coliforms & *E.coli*	<0.3 MPN/g & <3 MPN/g
Listeria spp rtPCR	Detected / 25g or Not Detected / 25g
Salmonella spp rtPCR	Detected / 25g or Not Detected / 25g
Coagulase Positive *Staphylococcus aureus*	<100cfu/g

MPN = most probable number
rt-PCR = real-time polymerase chain reaction
cfu = colony forming unit

Specification of PT Samples

PT will not be available for this program.

Program 169: Multi-residue pesticide screen including dithiocarbamates in macadamia nuts, almonds, apples and pears

ANALYTE	NRS LOR (mg/kg)
FUNGICIDES	
2-phenylphenol *Sum of 2-phenylphenol 2-phenylphenate expressed as 2-phenylphenol*	0.050
azoxystrobin	0.010
benalaxyl	0.010
benomyl *(see carbendazim)* *(n.b. residues arising from the use of benomyl are covered by MRLs for carbendazim)*	
bitertanol	0.010
boscalid	0.010
buprimate	0.010
captafol	0.050
captan	0.050
carbendazim *Sum of carbendazim (parent) 2-aminobenzimidazole expressed as carbendazim*	0.010 0.010
chlorothalonil	0.010
cyproconazole *Sum of isomers*	0.010
cyprodinil	0.010
difenoconazole	0.010
dimethomorph *Sum of E & Z isomers*	0.010
dithianon	0.010
dithiocarbamates# (mancozeb, metham, metiram, thiram, zineb and ziram)^ *(Total dithiocarbamates, determined as CS_2 evolved during acid digestion and expressed as mg CS_2/kg)*	0.20
dodine	0.010
epoxiconazole	0.010
etridiazole	0.010
fenarimol	0.010
fenbuconazole	0.010
fenhexamid	0.010
flonicamid *Sum of flonicamid (parent) N-(4-trifluoromethylnicotinoyl)glycine (TFNG) 4-trifluoromethylnicotinic acid (TFNA) expressed as flonicamid*	0.010 0.010 0.020
fluazinam	0.010
fludioxonil	0.010
fluopyram *(Commodities of plant origin: fluopyram)*	0.010

ANALYTE	NRS LOR (mg/kg)
fluquinconazole	0.010
flusilazole	0.010
flutriafol	0.010
hexaconazole	0.010
imazalil	0.010
iprodione	0.010
isopyrazam	**0.010**
kresoxim-methyl	0.010
mandestrobin	0.010
mefentrifluconazole	**0.010**
metalaxyl	0.010
metrafenone	0.010
myclobutanil	0.010
oxadixyl	0.010
penconazole	0.010
penthiopyrad	0.010
prochloraz *Sum of prochloraz and its metabolites containing the 2,4,6-trichlorophenol moiety, expressed as prochloraz* *prochloraz (parent)* *2,4,6-trichlorophenol*	 0.010 0.010
procymidone	0.010
propiconazole	0.010
prothioconazole *Sum of* *prothioconazole (parent)* *prothioconazole desthio (2-(1-chlorocyclopropyl)-1-(2-chlorophenyl)-3-(1H-1,2,4-triazol-1-yl)-propan-2-ol)* *expressed as prothioconazole*	 0.050 0.010
pyraclostrobin	0.010
pyrimethanil	0.010
tebuconazole	0.010
thiabendazole	0.010
triadimefon *(see also tridimenol)* *Sum of* *triadimefon (parent)* *triadimenol (as triadimefon metabolite)* *expressed as triadimefon*	 0.010 0.010
triadimenol *(n.b. in the absence of triadimefon, assume presence due to use of triadimenol alone)*	0.010

ANALYTE	NRS LOR (mg/kg)
trifloxystrobin *Sum of*	
trifloxystrobin (parent)	0.010
trifloxystrobin acid metabolite ((E,E)-methoxyimino-[2-[1-(3-trifluoromethylphenyl)-ethylideneaminooxymethyl]phenyl] acetic acid)	**0.010**
expressed as trifloxystrobin equivalents	
triforine	0.010
triticonazole	0.010
vinclozolin	0.010
CARBAMATES	
aldicarb *Sum of*	
aldicarb (parent)	0.010
aldicarb sulfoxide	0.010
aldicarb sulfone	0.010
expressed as aldicarb	
carbaryl	0.010
carbofuran *Sum of*	
carbofuran (parent)	0.010
and 3-hydroxycarbofuran	0.010
expressed as carbofuran	
chlorpropham	0.050
fenoxycarb	0.010
methiocarb *Sum of*	
methiocarb (parent)	0.010
methiocarb sulfoxide	0.010
methiocarb sulfone	0.010
expressed as methiocarb	
methomyl	0.010
pirimicarb *Sum of*	
pirimicarb (parent)	0.010
demethyl-pirimicarb	0.010
demethylformamido-pirimicarb	0.010
expressed as pirimicarb	
thiodicarb *Sum of*	
thiodicarb (parent)	0.010
methomyl (as thiodicarb metabolite)	0.010
expressed as thiodicarb	
ORGANOCHLORINES	
aldrin and dieldrin *Sum of*	
aldrin (HHDN)	0.010
dieldrin (HEOD)	0.010
chlordane *Sum of*	
chlordane (cis)	0.010
chlordane (trans)	0.010

ANALYTE	NRS LOR (mg/kg)
DDT *Sum of*	
DDT (p,p')	0.010
DDT (o,p')	0.010
DDE (p,p')	0.010
DDD (p,p ')	0.010
dicofol *Sum of*	
dicofol (p,p')	0.010
2,2,2-trichloro-1-(4-chlorophenyl)-1-(2-chlorophenyl) ethanol (dicofol (o,p'))	0.010
expressed as dicofol	
endosulfan *Sum of*	
endosulfan (alpha)	0.010
endosulfan (beta)	0.010
endosulfan sulfate	0.010
endrin *Sum of*	
endrin (parent)	0.010
delta-keto-endrin	0.010
HCB *(hexachlorobenzene)*	0.010
HCH *(BHC)* *Sum of isomers of 1,2,3,4,5,6-hexachlorocyclohexane other than lindane (gamma-HCH)*	
HCH (alpha)	0.010
HCH (beta)	0.010
HCH (delta)	0.010
heptachlor *Sum of*	
heptachlor (parent)	0.010
*heptachlor epoxide***	0.010
lindane *(gamma-HCH)*	0.010
ORGANOPHOSPHATES	
acephate	0.050
azamethiphos	0.010
azinphos-methyl	0.010
cadusafos	0.010
chlorfenvinphos *Sum of E and Z isomer*	0.010
chlorpyrifos	0.0050
chlorpyrifos-methyl	0.0050
diazinon	0.010
dichlorvos	0.010
dimethoate *(see also omethoate)* *Sum of*	
dimethoate (parent)	0.010
omethoate (as metabolite of dimethoate)	0.010

ANALYTE	NRS LOR (mg/kg)
disulfoton *Sum of*	
disulfoton (parent)	0.010
demeton-S	0.010
disulfoton sulfoxide	0.010
disulfoton sulfone	0.010
demeton-S sulfoxide	0.010
demeton-S sulfone	0.010
expressed as disulfoton	
ethion	0.010
ethoprofos	0.0050
fenamiphos *Sum of*	
fenamiphos (parent)	0.010
fenamiphos sulfoxide	0.010
fenamiphos sulfone	0.010
expressed as fenamiphos	
fenitrothion	0.010
fenthion *Sum of*	
fenthion (parent)	0.010
fenthion sulfoxide	0.010
fenthion sulfone	0.010
fenthion oxygen-analogue	0.010
fenthion oxygen-analogue sulfoxide	0.010
fenthion oxygen-analogue sulfone	0.010
expressed as fenthion	
malathion (maldison)	0.010
methacrifos	0.010
methamidophos	0.010
methidathion	0.010
mevinphos	0.010
monocrotophos	0.010
omethoate *(see also dimethoate)* *(n.b. in the absence of dimethoate, assume presence due to use of omethoate alone)*	0.010
parathion (parathion ethyl)	0.010
parathion methyl	0.010
phorate *Sum of*	
phorate (parent)	0.010
phorate sulfoxide	0.010
phorate sulfone	0.010
phorate oxygen analogue	0.010
phorate oxygen analogue sulfoxide	0.010
phorate oxygen analogue sulfone	0.010
expressed as phorate	

ANALYTE		NRS LOR (mg/kg)
phosmet	*Sum of*	
	phosmet (parent)	0.010
	phosmet oxygen-analogue	0.010
	expressed as phosmet	
pirimiphos methyl		0.010
profenofos		0.010
prothiofos		0.010
terbufos	*Sum of*	
	terbufos (parent)	0.010
	terbufos sulfone	0.010
	terbufos sulfoxide	0.010
	terbufos oxygen analogue	0.010
	tebufos oxygen analogue sulfone	0.010
	terbufos oxygen analogue sulfoxide	0.010
	expressed as terbufos	
toclophos methyl		0.010
triazofos		0.010
trichlorfon		0.010
SYNTHETIC PYRETHROIDS		
bifenthrin		0.010
bioresmethrin		0.010
cyfluthrin	*Sum of isomers*	0.010
cyhalothrin	*Sum of isomers*	0.010
cypermethrin	*Sum of isomers*	0.010
deltamethrin		0.010
fenvalerate	*Sum of isomers*	0.010
	esfenvalerate	0.010
permethrin	*Sum of isomers*	0.010
phenothrin	*Sum of (+)cis- and (+)trans- isomers*	0.010
tau-fluvalinate		0.010
INSECTICIDES / ACARICIDES		
abamectin	*avermectin B1a*	0.010

ANALYTE	NRS LOR (mg/kg)
bifenazate *Sum of*	
bifenazate (parent)	0.010
bifenazate diazene	0.010
expressed as bifenazate	
buprofezin	0.010
chlorantraniliprole	0.010
chlorfenapyr	0.010
clofentezine	0.010
clothianidin	0.010
cyantraniliprole *(Commodities of plant origin: cyantraniliprole)*	0.010
emamectin *Sum of*	
emamectin B1a	0.010
emamectin B1b	
etoxazole	0.010
fenbutatin oxide (*bis[tris(2-methyl-2-phenylpropyl)tin]-oxide)*	0.010
fenpyroximate	0.010
fipronil *Sum of*	
fipronil (parent)	0.010
fipronil sulfenyl metabolite	0.010
fipronil sulfonyl metabolite	0.010
fipronil trifluoromethyl metabolite	0.010
flupyradifurone	**0.010**
hexythiazox	0.010
imidacloprid *Sum of imidacloprid and metabolites containing the 6-chloropyridinylmethylene moiety, expressed as imidacloprid*	
imidacloprid (parent)	0.010
imidacloprid-olefin	0.010
imidacloprid-5-hydroxy	0.010
indoxacarb *Sum of indoxacarb and its R-isomer*	0.010
metaldehyde	0.050
methoprene *(Sum of cis- and trans- isomers*	0.010
methoxychlor	0.010
methoxyfenozide	0.010
mirex	0.010
novaluron	0.010
propargite	0.010
pymetrozine	0.010

ANALYTE	NRS LOR (mg/kg)
pyrethrins *Sum of*	
pyrethrin I	0.050
pyrethrin II	0.050
cinerin I	0.050
cinerin II	0.050
jasmolin I	0.050
jasmolin II	0.050
determined after calibration by means of the International Pyrethrum Standard)	
pyridaben	0.020
pyriproxyfen	0.010
spinetoram *Sum of*	
ethyl-spinosyn J (major)	0.010
ethyl-spinosyn L (minor)	0.010
spinosad *Sum of*	
spinosyn A	0.010
spinosyn D	0.010
spirotetramat *Sum of*	
spirotetramat (parent)	0.010
cis-3-(2,5-dimethylphenyl)-4-hydroxy-8-methoxy-1-azaspiro[4.5]dec-3-en-2-one, expressed as spirotetramat	0.010
sulfoxaflor	0.010
tebufenozide	0.010
tebufenpyrad	0.010
tetradifon	0.010
thiacloprid	0.010
thiamethoxam	0.010
OTHER PESTICIDES	
acetamiprid	0.010
amitraz *Sum of*	
amitraz (parent)	0.010
N-(2,4-dimethylphenyl)-N '-methylformamidine expressed as N-(2,4-dimethylphenyl)- N'-methylformamidine	0.010
diflubenzuron	0.010
paclobutrazol	0.010
piperonyl butoxide	0.010
triflumuron	0.010
PHYSIOLOGICAL MODIFIER	
diphenylamine	0.010
forchlorfenuron	**0.010**
prohexadione-calcium ***Sum of***	
free prohexadione (parent)	**0.010**
and conjugated forms of prohexadione	
expressed as prohexadione	

ANALYTE	NRS LOR (mg/kg)
HERBICIDES	
2,2-DPA *(2,2-dichloropropionic acid)*	0.050
2,4-D	0.010
atrazine	0.010
bromacil	0.010
bromoxynil	0.010
carfentrazone-ethyl	0.010
chlorsulfuron	0.010
chlorthal-dimethyl	0.010
clethodim *(n.b. residues arising from the use of clethodim are covered by the MRLs for sethoxydim)* *clethodim (parent)*	0.010
clodinafop-propargyl	0.010
clopyralid	0.050
cyanazine	0.010
dicamba	0.010
dichlobenil	0.010
dichlorprop-P *Sum of dichlorprop acid, its esters and conjugates, hydrolysed to dichlorprop acid, and expressed as dichlorprop acid* *dichlorprop (unconjugated)*	0.010
diflufenican	0.010
diuron *(Sum of* *diuron (parent)* *3,4-dichloroaniline (as metabolite of diuron)* *expressed as diuron)*	0.010 0.050
ethofumesate	0.010
fenoxaprop-ethyl *Sum of fenoxaprop-ethyl (all isomers) and 2-(4-(6-chloro-2-benzoxazoyloxy)phenoxy)-propanoate and 6-chloro-2,3-dihydrobenzoxazol-2-one, expressed as fenoxaprop-ethyl* *fenoxaprop-ethyl (sum of isomers)*	0.010
flumioxazin	0.010
iodosulfuron-methyl	0.010
ioxynil	0.010
isoxaben	0.010
linuron *Sum of* *linuron (parent)* *3,4-dichloroaniline* *expressed as linuron*	0.010 0.050
MCPA	0.010
metamitron	**0.010**
methabenzthiazuron	0.010
metolachlor	0.010
metosulam	0.010
metribuzin	0.010
metsulfuron-methyl	0.010

ANALYTE	NRS LOR (mg/kg)
napropamide	0.010
norflurazon	0.010
oryzalin	0.010
oxyfluorfen	0.010
pendimethalin	0.010
picloram	0.010
propachlor *Sum of propachlor and metabolites hydrolysable to N-isopropylaniline, expressed as propachlor* *propachlor (parent)* *N-isopropylaniline*	 0.010 0.010
propyzamide	0.010
quizalofop-ethyl *Sum of and quizalofop acid and other esters, expressed as quizalofop-ethyl* *quizalofop-ethyl (parent)*	 0.010
quizalofop-p-tefuryl *Sum of quizalofop-P-tefuryl and quizalofop acid, expressed as quizalofop-P-tefuryl* *quizalofop-P-tefuryl (parent)*	 0.010
saflufenacil *Sum of saflufenacil, N'-{2-chloro-4-fluoro-5-[1,2,3,6-tetrahydro-2,6-dioxo-4-(trifluoromethyl)pyrimidin-1-yl]benzoyl-N-isopropyl sulfamide and N-[4-chloro-2-fluoro-5-({[(isopropylamino)sulfonyl]amino}carbonyl)phenyl]urea, expressed as saflufenacil equivalents*	0.010 0.010 0.010
sethoxydim *Sum of sethoxydim and metabolites containing the 5-(2-ethylthiopropyl)cyclohexene-3-one and 5-(2-ethylthiopropyl)-5-hydroxycyclohexene-3-one moieties and their sulfoxides and sulfones, expressed as sethoxydim* *sethoxydim (parent)*	 0.010
simazine	0.010
tralkoxydim	0.010
triasulfuron	0.010
triclopyr	0.010
trifluralin	0.010

** laboratories should be aware that heptachlor epoxide exists as two isomers (exo and endo). Samples in the current PT programs will be spiked with the exo isomer.
# propineb has a distinct residue definition and MRLs from the other dithiocarbamates shown in the table above, propineb will not be included in the testing program
^

Note: The analytes shown in bold in the table above have been added to Program 1699 testing and may be included in PT samples from January 2023.

Specification of PT Samples

The 4-6 samples per round will comprise approximately 10g of frozen, spiked, homogenised macadamia nuts and/or apples or pears and/or citrus packed in glass jars (replicates will be provided). This is to be thawed and the entire sample extracted for analysis. Residue definition analytes to be reported individually (see Appendix 4).

Note: PT samples for the horticultural multi-residue program will <u>not</u> include dithiocarbamates

Program 179: Patulin in apple and pear juice

ANALYTE	NRS LOR (mg/kg)
patulin	0.010

HONEY PROGRAMS

Program No	**Program Name**
PROGRAM 201	ANTIMICROBIALS in HONEY
PROGRAM 203	PHENICOLS in HONEY
PROGRAM 204	NITROFURAN METABOLITES in HONEY
PROGRAM 206	METALS in HONEY
PROGRAM 208	PESTICIDES in HONEY
PROGRAM 209	PARADICHLOROBENZENE in HONEY

PT is not generally run for the honey programs

Program 201: Antimicrobials in honey

ANALYTE	NRS LOD (screening) (mg/kg)
AMINOGLYCOSIDES	
apramcyin	0.050
dihydrostreptomycin	0.10
gentamycin	0.050
neomycin	0.050
streptomycin	0.10
BETA LACTAMS	
Penicillins	
amoxicillin	0.010
ampicillin	0.010
benzyl G penicillin	0.010
cloxacillin	0.010
Cephalosporins	
ceftiofur	0.10
cefuroxime	0.050
cephalonium	0.050
FLUOROQUINOLONE	
norfloxacin	0.020
MACROLIDES/LINCOSAMIDES	
erythromycin	0.050
lincomycin	0.050
oleandomycin	0.050
tilmicosin	0.050
tylosin	0.020
TETRACYCLINES	
(Inhibitory substance, identified as chlortetracycline)	
chlortetracycline	0.010
chlortetracycline *4-epichlortetracycline*	0.010
(Inhibitory substance, identified as oxytetracycline)	
oxytetracycline	0.010
oxytetracycline *4-epioxytetracycline*	0.010
(Inhibitory substance, identified as tetracycline)	
tetracycline	0.010
tetracycline *4-epitetracycline*	0.010
doxycycline	0.010
SULFONAMIDES	
sulfachloropyridazine	0.020
sulfadiazine	0.020
sulfadimethoxine	0.020
sulfadimidine (sulfamethazine)	0.020
sulfadoxine	0.020

ANALYTE	NRS LOD (screening) (mg/kg)
sulfafurazole	0.020
sulfamerazine	0.020
sulfamethoxazole	0.020
sulfamethoxydiazine (sulfameter)	0.020
sulfamethoxypyridazine	0.020
sulfapyridine	0.020
sulfaquinoxaline	0.020
sulfathiazole	0.020
sulfatroxazole	0.020
TRIAMILIDES	
tulathromycin — *Sum of tulathromycin and its metabolites that are converted by acid hydrolysis to (2R, 3S, 4R, 5R, 8R, 10R, 11R, 12S, 13S, 14R)-2-ethyl-3,4,10,13-tetrahydroxy-3,5,8,10,12,14-hexamethyl-11-[[3,4,6-trideoxy-3-(dimethylamino)-ß-D-xylohexopyranosyl]oxy]-1-oxa-6-azacyclopentadecan-15-one, expressed as tulathromycin equivalents*	
tulathromycin (parent)	0.10
OTHERS	
virginiamycin	0.050
trimethoprim	0.020

Specification of PT Samples

PT will not be available for this program. PT relating to Program 1 may cover the PT requirements for this program as well, therefore participation in Program 1 PT may be required for laboratories contracted for Programs 201. The laboratory contracted for this program may only seek the analytes relevant to Program 201 included in Program 1 PT. Refer to Program 1 section for further details on the Specification of Program 1 PT Samples.

Program 203: Phenicols in honey

ANALYTE	NRS LOR (mg/kg)
chloramphenicol	0.00030
florfenicol *Sum of florfenicol and its metabolites florfenicol alcohol, florfenicol oxamic acid, monochloroflorfenicol and florfenicol amine expressed as florfenicol amine*	0.0030
thiamphenicol	0.0011

Specification of PT Samples

PT will not be available for this program. PT relating to Program 3 may cover the PT requirements for this program as well, therefore participation in Program 3 PT may be required for laboratories contracted for Programs 203. The laboratory contracted for this program may only seek the analytes relevant to Program 203 included in Program 3 PT. Refer to Program 3 section for further details on the Specification of Program 3 PT samples.

Program 204: Nitrofuran metabolites in honey

ANALYTE	NRS LOR (mg/kg)
1-aminohydantoin (AHD)	0.00050
3-amino-5-morpholinomethyl-1,3-oxazolidin-2-one (AMOZ)	0.00050
3-amino-2-oxazolidinone (AOZ)	0.00050
semicarbazide (SEM)	0.00050

Note: The test method used must cover both free and conjugated forms of the nitrofuran metabolites.

Specification of PT Samples

PT will not be available for this program.

Program 206: Metals in honey

ANALYTE	NRS LOR (mg/kg)
aluminium (Al)	0.50
lead (Pb)	0.010
selenium (Se)	0.050
zinc (Zn)	0.050

Specification of PT Samples

PT relating to Program 16 will encompass those analytes relevant to cover the PT requirements for the other animal metal programs as well (See *'Relevant participation for NRS contract laboratories – special cases'*, section for more information).

Note: Participation in Program 16 PT will be required for laboratories contracted for Programs 16 (including horse muscle samples), 206, and 316.

The laboratory contracted for this program may only seek the analytes relevant to Program 206 (Al, Pb, Se, Zn) included in Program 16 PT and therefore only be assessed against those analytes. Refer to Program 16 section for further details on the Specification of Program 16 PT samples.

Program 208: Pesticides in honey

ANALYTE	NRS LOR (mg/kg)
CARBAMATES	
carbaryl *Sum of*	
carbaryl	0.010
and conjugates, hydrolysed to carbaryl, expressed as carbaryl	
ORGANOCHLORINES	
aldrin and dieldrin *Sum of*	
aldrin (HHDN)	0.010
dieldrin (HEOD)	0.010
chlordane *Sum of*	
chlordane (cis)	0.010
chlordane (trans)	0.010
oxychlordane	0.010
DDT *Sum of*	
DDT (p,p')	0.010
DDT (o,p')	0.010
DDE (p,p')	0.010
DDD (p,p ')	0.010
dicofol *Sum of*	
dicofol (p,p')	0.010
,2-trichloro-1-(4-chlorophenyl)-1-(2-chlorphenyl) ethanol (dicofol (p,p'))	0.010
expressed as dicofol	
endosulfan *Sum of*	
endosulfan (alpha)	0.010
endosulfan (beta)	0.010
endosulfan sulfate	0.010
endrin *Sum of*	
endrin (parent)	0.010
delta-keto-endrin	0.010
HCB *(hexachlorobenzene)*	0.010
HCH *(BHC)* *Sum of isomers of 1,2,3,4,5,6-hexachlorocyclohexane other than lindane (gamma-HCH)*	
HCH (alpha)	0.010
HCH (beta)	0.010
HCH (delta)	0.010
heptachlor *Sum of*	
heptachlor (parent)	0.010
heptachlor epoxide (endo)	0.010
*heptachlor epoxide (exo)***	0.010
lindane *(gamma-HCH)*	0.010
methoxychlor	0.010
mirex	0.010

ANALYTE	NRS LOR (mg/kg)
ORGANOPHOSPHATES	
chlorfenvinphos *Sum of E and Z isomers*	0.010
chlorpyrifos	0.010
chlorpyrifos-methyl	0.010
coumaphos *Sum of*	
coumaphos (parent)	0.010
coumaphos (oxygen-analogue)	0.010
expressed as coumaphos	
diazinon	0.010
dichlorvos	0.010
dimethoate *(see also omethoate)* *Sum of*	
dimethoate (parent)	0.010
omethoate (as dimethoate metabolite)	0.010
expressed as dimethoate	
ethion	0.010
famphur	0.010
fenitrothion	0.010
fenthion *Sum of*	
fenthion (parent)	0.010
fenthion sulfoxide	0.010
fenthion sulfone	0.010
fenthion oxygen-analogue	0.010
fenthion oxygen-analogue sulfoxide	0.010
fenthion oxygen-analogue sulfone	0.010
expressed as fenthion	
malathion (maldison)	0.010
methidathion	0.010
omethoate *(see also dimethoate)* *(n.b. in the absence of dimethoate assume presence due to use of omethoate alone)*	0.010
parathion methyl	0.010
phosmet *Sum of*	
phosmet (parent)	0.010
phosmet (oxygen-analogue)	
expressed as phosmet	
pirimiphos methyl	0.010
prothiofos	0.010
temephos *Sum of*	
temephos (parent)	0.010
temephos sulfoxide	
expressed as temephos	
SYNTHETIC PYRETHROIDS	
bifenthrin	0.010
bioresmethrin	0.010

ANALYTE	NRS LOR (mg/kg)
cyfluthrin *Sum of isomers*	0.010
cyhalothrin *Sum of isomers*	0.010
cypermethrin *Sum of isomers*	0.010
deltamethrin	0.010
fenvalerate *Sum of isomers*	0.010
flumethrin *Sum of isomers*	0.0050
fluvalinate *Sum of isomers*	0.010
permethrin *Sum of isomers*	0.010
OTHER PESTICIDES	
amitraz *Sum of*	
amitraz (parent)	
N-(2,4-dimethylphenyl)-N '-methylformamidine	0.010
expressed as N-(2,4-dimethylphenyl)-N '-methylformamidine	
acetamiprid *Commodities of animal origin: Sum of*	
acetamiprid (parent)	0.010
N-demethyl acetamiprid ((E)-N1-[(6-chloro-3-pyridyl)methyl]-N2-cyanoacetamidine	0.010
expressed as acetamiprid	
chlorantraniliprole	0.010
clothianidin	0.010
cyantraniliprole	0.010
fipronil *Sum of*	
fipronil (parent)	0.010
fipronil - sulfenyl metabolite	0.010
fipronil - sulfonyl metabolite	0.010
fipronil trifluoromethyl metabolite	0.010
flubendiamide *(Commodities of animal origin: sum of flubendiamide and 3- iodo-N-(2-methyl-4-[1,2,2,2-tetrafluoro-1-(trifluoromethyl)ethyl]phenyl)phthalimide, expressed as flubendiamide)*	
flubendiamide (parent)	0.010
3-iodo-N-(2-methyl-4-[1,2,2,2-tetrafluoro-1-(trifluoromethyl)ethyl]phenyl)phthalimide	
fluxapyroxad	0.010
imidacloprid *Sum of imidacloprid and metabolites containing the 6-chloropyridinylmethylene moiety expressed as imidacloprid*	
imidacloprid (parent)	0.010
imidacloprid-olefin	0.010
imidacloprid-5-hydroxy metabolite	0.010
pyraclofos	0.010
spirotetramat *Sum of*	
spirotetramat (parent)	0.010
cis-3-(2,5-dimethylphenyl)-4-hydroxy-8-methoxyl-1-azaspiro[4.5]dec-3-en-2-one	0.010
expressed as spirotetramat	
sulfoxaflor	0.010
thiacloprid	0.010

ANALYTE	NRS LOR (mg/kg)
thiamethoxam	
Sum of	
thiamethoxam	0.010
N-(2-choro-thiazol-5-ylmethyl)-N'-methyl-N'-nitro-guanidine	
expressed as thiamethoxam	
CONTAMINANTS	
Polychlorinated biphenyls (PCBs)	
Arochlor 1254	0.010
Arochlor 1260	0.010
pentachlorobenzene	0.010
ACARICIDES	
chlorfenapyr	0.010
indoxacarb	0.010
Sum of indoxacarb and its R-isomer	
FUNGICIDES	
boscalid	
(Commodities of animal origin: Sum of boscalid, 2-chloro-N-(4'-chloro-5-hydroxybiphenyl-2-yl) nicotinamide and the glucuronide conjugate of 2-chloro-N-(4'-chloro-5-hydroxybiphenyl-2-yl) nicotinamide, expressed as boscalid equivalents)	
boscalid (parent	0.010
2-chloro-N-(4'-chloro-5-hydroxybiphenyl-2-yl) nicotinamide	0.010
expressed as boscalid equivalents	
carbendazim	
Sum of	
carbendazim (parent)	0.010
2-aminobenzimadazole	0.010
expressed as carbendazim	
cyproconazole	0.010
Sum of isomers	
fluquinconazole	0.010
flutriafol	0.010
procymidone	0.010
propiconazole	0.010
prothioconazole	
(Commodities of animal origin: sum of prothioconazole, prothioconazole desthio (2-(1-chlorocyclopropyl)-1-(2-chlorophenyl)-3-(1H-1,2,4-triazol-1-yl)-propan-2-ol), prothioconazole-3-hydroxy-desthio (2-(1-chlorocyclopropyl)-1-(2-chloro-3-hydroxyphenyl)-3-(1H-1,2,4-triazol-1-yl)-propan-2-ol) and prothioconazole-4-hydroxy-desthio (2-(1-chlorocyclopropyl)-1-(2-chloro-4- hydroxyphenyl)-3-(1H-1,2,4-triazol-1-yl)-propan-2-ol), expressed as prothioconazole	
prothioconazole (parent)	0.030
prothioconazole desthio (2-(1-chlorocyclopropyl)-1-(2-chlorophenyl)-3-(1H-1,2,4-triazol-1-yl)-propan-2-ol)	0.020
prothioconazole-3-hydroxy-desthio or alternative name prothioconazole-3-hydroxy-desthio (2-(1-chlorocyclopropyl)-1-(2-chloro-3-hydroxyphenyl)-3-(1H-1,2,4-triazol-1-yl)-propan-2-ol)	0.010
prothioconazole-4-hydroxy-desthio or alternative name prothioconazole-4-hydroxy-desthio (2-(1-chlorocyclopropyl)-1-(2-chloro-4- hydroxyphenyl)-3-(1H-1,2,4-triazol-1-yl)-propan-2-ol)	0.010
expressed as prothioconazole	
quintozene	
Sum of	
quintozene (parent)	0.010
pentachloroaniline	0.010
methyl pentachlorophenyl sulphide	0.010
expressed as quintozene	

ANALYTE	NRS LOR (mg/kg)
HERBICIDES	
ethofumesate	0.010
metolachlor	0.010
propachlor *Sum of* *propachlor (parent)* *and metabolites hydrolysable to N-isopropylaniline, expressed as propachlor*	 0.010
pyrasulfotole *Sum of* *pyrasulfotole (parent)* *pyrasulfotole desmethyl or alternative name (5-hydroxy-3-methyl-1H-pyrazol-4-yl)[2-mesyl-4-(trifluoromethyl)phenyl]methanone*	 0.010 0.020

** laboratories should be aware that heptachlor epoxide exists as two isomers (exo and endo). Samples in the current PT programs will be spiked with the exo isomer.

Specification of PT Samples

PT will not be available for this program.

Program 209: Paradichlorobenzene in honey

ANALYTE	NRS LOR (mg/kg)
paradichlorobenzene	0.0010

Specification of PT Samples

PT will not be available for this program.

SEAFOOD PROGRAMS

Program No	**Program Name**
PROGRAM 306	STEROIDS in SEAFOOD
PROGRAM 308	PESTICIDES in SEAFOOD
PROGRAM 316	METALS in SEAFOOD
PROGRAM 317	DYES in SEAFOOD
PROGRAM 333	QUINOLONES and FLUOROQUINOLONES in SEAFOOD

PT is not generally run for the seafood programs.

Note 1: The suite of analytes included in Program 308 has recently been significantly extended.

Note 2: Inorganic arsenic is a program element in the secondary test for Program 316 however not all samples are automatically analysed for inorganic arsenic. NRS Animals Program staff will determine whether it is necessary to proceed to test for inorganic arsenic on a sample-by-sample basis.

PT participants (including the Program 316 contract laboratory) is only required to analyse and report arsenic (total) values in Program 16 PT.

Program 306: Steroids in seafood

ANALYTE	NRS LOR (mg/kg)
STILBENES	
dienoestrol	0.000090
diethylstilboestrol	0.000090
hexoestrol	0.000090
TRENBOLONE	
trenbolone acetate	
Sum of	
trenbolone acetate	
trenbolone (17-alpha)	0.00075
trenbolone (17-beta)	0.00075
both free and conjugated expressed as trenbolone	
ANDROGENICS	
boldenone (17 alpha-)	0.00036
boldenone (17 beta-)	0.00036
19-nortestosterone (17 alpha-) [*or epinandrolone]*	0.00036
19-nortestosterone (17 beta-) [*or nandrolone*]	0.00036

Note: The method used must cover both free and conjugated forms of all program analytes.

PT will not be available for this program.

Program 308: Pesticides in seafood

ANALYTE	NRS LOR (mg/kg)
INSECTICIDES	
acephate	0.010
acrinathrin	0.010
aldicarb *Sum of* *aldicarb (parent)* *aldicarb sulfoxide* *aldicarb sulfone* *expressed as aldicarb*	 0.010 0.010 0.010
anilofos	0.010
azinphos-ethyl	0.010
azinphos-methyl	0.010
bendiocarb *Commodities of animal origin: Sum of* *conjugated bendiocarb* *unconjugated bendiocarb* *2,2-dimethyl-1,3-benzodioxol-4-ol and N-hydroxymethylbendiocarb* *expressed as bendiocarb*	 0.010
bifenthrin	0.010
bioresmethrin	0.010
bromophos	0.010
bromophos-ethyl	0.010
bromopropylate	0.010
buprofezin	0.010
cadusafos	0.010
carbaryl	0.010
carbetamide	0.010
carbofuran *Sum of* *carbofuran (parent)* *3-hydroxycarbofuran* *expressed as carbofuran*	 0.010
chlorantraniliprole	0.010
chlorbufam	0.010
chlorfenapyr	0.010
chlorfenvinphos (sum of isomers)	0.010
chlorpyrifos	0.010
chlorpyrifos-methyl	0.010
chlorthiophos	0.010
chromafenozide	0.010
clothianidin	0.010
coumaphos *Sum of* *coumaphos (parent)* *coumaphos oxygen-analogue* *expressed as coumaphos*	 0.010 0.010

ANALYTE	NRS LOR (mg/kg)
crufomate	0.010
cyanophos	0.010
cyantraniliprole	0.010
cyfluthrin (sum of isomers)	0.020
cypermethrin (sum of isomers)	0.010
deltamethrin	0.010
demeton-S-methyl sulfoxide (oxydemeton-methyl)	0.020
diazinon	0.010
dichlofenthion	0.010
dicrotophos	0.010
diflubenzuron	0.010
dimethoate *Sum of* *dimethoate* *omethoate (as a metabolite of dimethoate)* *expressed as dimethoate*	 0.010 0.010
dimethylvinphos	0.010
dioxabenzofos	0.010
EPN	0.010
ethion	0.010
ethiprole	0.010
ethoprophos	0.010
etoxazole	0.010
etrimfos	0.010
famphur	0.010
fenamiphos *Sum of* *fenamiphos (parent)* *fenamiphos sulfoxide* *fenamiphos sulfone* *expressed as fenamiphos*	 0.010 0.010 0.010
fenchlorphos	0.010
fenitrothion	0.010
fenobucarb	0.010
fenothiocarb	0.010
fenoxycarb	0.010
fenpropathrin	0.010
fensulfothion *Sum of* *fensulfothion (parent)* *fensulfothion sulfone* *fensulfothion oxygen analogue* *fensulfothion oxygen analogue sulfone*	 0.010
fenthion *Sum of* *fenthion (parent)* *fenthion sulfoxide*	 0.010 0.010

ANALYTE	NRS LOR (mg/kg)
fenthion sulfone	0.010
fenthion oxygen-analogue	0.010
fenthion oxygen-analogue sulfoxide	0.010
fenthion oxygen-analogue sulfone	0.010
expressed as fenthion	
fenthion-ethyl	0.010
fenvalerate (sum of isomers)	0.010
fipronil *Sum of*	
fipronil (parent)	0.010
fipronil - sulfenyl metabolite	0.010
fipronil - sulfonyl metabolite	0.010
fipronil trifluoromethyl metabolite	0.010
fluacrypyrim	0.010
flubendazole *Sum of*	
flubendazole (parent)	0.010
2-amino-1 H-benzimidazole-5-yl 4-fluorophenyl methanone	
expressed as flubendazole	
flucythrinate	0.010
flumethrin	0.020
fluvalinate (sum of isomers)	0.010
fonofos	0.010
formetanate	0.010
fosthiazate	0.010
furathiocarb	0.010
heptenophos	0.010
imidacloprid *Sum of imidacloprid and metabolites containing the 6-chloropyridinylmethylene moiety, expressed as imidacloprid*	
imidacloprid (parent)	0.020
imidacloprid-olefin	0.020
imidacloprid-5-hydroxy metabolite	0.020
indoxacarb	0.010
iodofenphos	0.010
isazophos	0.010
isofenphos	0.010
isofenphos-methyl	0.020
isoprocarb	0.010
isoxathion	0.010
leptophos	0.010
malathion (maldison)	0.010
methacrifos	0.010
methamidophos	0.010
methidathion	0.010
methiocarb *Sum of*	
methiocarb (parent)	0.010

ANALYTE	NRS LOR (mg/kg)
methiocarb sulfoxide *methiocarb sulfone* *expressed as methiocarb*	0.010
methomyl	0.010
methoxychlor	0.010
methoxyfenozide	0.010
mevinphos	0.010
monocrotophos	0.010
novaluron	0.020
omethoate *(see also dimethoate)* *(n.b. in the absence of dimethoate, assume presence due to use of omethoate alone)*	0.010
oxamyl *Sum of* *oxamyl (parent)* *2-hydroxyimino-N,N-dimethyl-2-(methylthio)-acetamide* *expressed as oxamyl*	0.010
parathion	0.010
parathion-methyl	0.010
perthane	0.010
phenmedipham *Commodities of animal origin:* *3-methyl-N-(3-hydroxyphenyl)carbamate* *phenmedipham (parent)*	0.010
phorate *Sum of* *phorate (parent)* *phorate sulfoxide* *phorate sulfone* *phorate oxygen analogue* *phorate oxygen analogue sulfoxide* *phorate oxygen analogue sulfone* *expressed as phorate*	0.010 0.010 0.010
phosalone	0.010
phosmet *Sum of* *phosmet (parent)* *phosmet oxygen-analogue* *expressed as phosmet*	0.010
phosphamidon	0.010
piperonyl butoxide	0.010
pirimicarb *Sum of* *pirimicarb (parent)* *demethyl-pirimicarb* *demethylformamido-pirimicarb* *expressed as pirimicarb*	0.010 0.010
pirimiphos-methyl	0.010
profenofos	0.010
promecarb	0.010

ANALYTE	NRS LOR (mg/kg)
propaphos	0.010
propargite	0.010
propetamphos	0.010
propoxur	0.010
prothiofos	0.010
pyraclofos	0.010
pyrazophos	0.010
pyridaben	0.010
pyridaphenthion	0.010
pyrifluquinazon	0.020
pyrimidifen	0.010
pyriproxyfen	0.010
quinalphos	0.010
spirotetramat *Sum of* *spirotetramat (parent)* *cis-3-(2,5-dimethylphenyl)-4-hydroxy-8-methoxyl-1-azaspiro[4.5]dec-3-en-2-one* *expressed as spirotetramat*	 0.010 0.010
sulfoxaflor	0.010
tebufenozide	0.010
tebufenpyrad	0.010
tefluthrin	0.010
terbufos *Sum of* *terbufos (parent)* *terbufos sulfone* *terbufos sulfoxide* *terbufos oxygen analogue* ***tebufos oxygen analogue sulfone*** ***terbufos oxygen analogue sulfoxide*** *expressed as terbufos*	 0.010 0.010 0.010
tetrachlorvinphos	0.010
tetradifon	0.010
thiabendazole *Sum of* *thiabendazole (parent)* *5-hydroxythiabendazole* *expressed as thiabendazole*	 0.010
thiacloprid	0.010
thiamethoxam *Sum of* *thiamethoxam* *N-(2-choro-thiazol-5-ylmethyl)-N'-methyl-N'-nitro-guanidine* *expressed as thiamethoxam*	 0.010
thiobencarb	0.010
transfluthrin	0.010
triazophos	0.010

ANALYTE	NRS LOR (mg/kg)
tribufos	0.010
trichlorfon	0.010
triflumuron	0.010
vamidothion *Sum of* *vamidothion (parent)* *vamidothion sulfoxide* *vamidothion sulfone* *expressed as vamidothion*	0.010
XMC	0.010
CONTAMINANTS	
aldrin and dieldrin *Sum of* *aldrin (HHDN)* *dieldrin (HEOD)*	 0.010 0.010
anthraquinone	0.010
chlordane *Sum of* *chlordane (cis)* *chlordane (trans)* *oxychlordane*	 0.010 0.010 0.010
chlorobenzilate	0.010
DDT *Sum of* *DDT (p,p')* *DDT (o,p')* *DDE (p,p')* *DDD (p,p')*	 0.010 0.010 0.010 0.010
endosulfan *Sum of* *endosulfan (alpha)* *endosulfan (beta)* *endosulfan sulfate*	 0.010 0.010 0.010
endrin *Sum of* *endrin (parent)* *delta-keto-endrin*	 0.010 0.010
HCB *(hexachlorobenzene)*	0.010
HCH *(BHC)* *Sum of isomers of 1,2,3,4,5,6-hexachlorocyclohexane other than lindane (gamma-HCH)* *HCH (alpha)* *HCH (beta)* *HCH (delta)*	 0.010 0.010 0.010
heptachlor *Sum of* *heptachlor (parent)* *heptachlor epoxide (endo)* *heptachlor epoxide (exo)***	 0.010 0.010 0.010
lindane *(gamma-HCH)*	0.010
mirex	0.010
PCB#101	0.010

ANALYTE	NRS LOR (mg/kg)
PCB#105	0.010
PCB#118	0.010
PCB#138	0.010
PCB#153	0.010
PCB#180	0.010
PCB#28	0.010
PCB#52	0.010
pentachlorobenzene	0.010
THPI	0.010
PHYSIOLOGICAL MODIFIER	0.010
diphenylamine	0.010
ethylchlozate	0.010
forchlorfenuron	0.010
FUNGICIDES	0.010
acibenzolar-S-methyl *Acibenzolar-S-methyl and all metabolites containing the benzo[1,2,3]thiadiazole-7-carboxyl moiety hydrolysed to benzo[1,2,3]thiadizole-7-carboxylic acid, expressed as acibenzolar-S-methyl.* *acibenzolar-S-methyl (parent)*	0.010
azaconazole	0.010
azoxystrobin	0.010
benalaxyl	0.010
benodanil	0.010
bitertanol	0.010
bixafen *Commodities of animal origin: Sum of* *bixafen (parent)* *N-(3',4'-dichloro-5-fluorobiphenyl-2-yl)-3-(difluoromethyl)-1H-pyrazole-4-carboxamide (bixafen-desmethyl)* *expressed as bixafen*	0.010
boscalid *Commodities of animal origin: Sum of* *boscalid (parent)* *2-chloro-N-(4'-chloro-5-hydroxybiphenyl-2-yl) nicotinamide* *and the glucuronide conjugate of 2-chloro-N-(4'-chloro-5-hydroxybiphenyl-2-yl) nicotinamide* *expressed as boscalid equivalents*	0.010
bupirimate	0.010
carbendazim *Sum of* *carbendazim (parent)* *2-aminobenzimadazole* *expressed as carbendazim*	0.010
carpropamid	0.010
chlozolinate	0.010
cyclanilide *Sum of* *cyclanilide (parent)* *and its methyl ester*	0.020

ANALYTE	NRS LOR (mg/kg)
expressed as cyclanilide	
cyflufenamid	0.010
cyproconazole	0.010
cyprodinil	0.010
diclobutrazol	0.010
diclocymet	0.010
dicloran	0.010
diethofencarb	0.010
difenoconazole	0.010
dimethomorph (sum of E and Z isomers)	0.010
edifenphos	0.010
epoxiconazole	0.010
etridiazole	0.010
fenamidone	0.010
fenarimol	0.010
fenbuconazole	0.010
fenoxanil	0.010
fenpropimorph	0.010
fenpyrazamine	0.010
ferimzone	0.010
fludioxonil *Commodities of animal origin: Sum of fludioxonil (parent) and oxidisable metabolites expressed as fludioxonil*	0.010
fluopicolide	0.010
fluopyram *Commodities of animal origin: Sum of fjuopyram (parent) 2-(trifluoromethyl) benzamide and the combined residues of N-{(E)-2-[3-chloro-5-(trifluoromethyl)pyridin-2-yl]ethenyl}-2-(trifluoromethyl) benzamide and N-{(Z)-2-[3-chloro-5-(trifluoromethyl)pyridin-2-yl]ethenyl}-2-(trifluoromethyl) benzamide expressed as fluopyram*	0.010
fluquinconazole	0.010
flusilazole	0.010
flutolanil *Sum of flutolanil (parent) and metabolites hydrolysed to 2-(trifluoromethyl)-benzoic acid expressed as flutolanil*	0.010
flutriafol	0.010
fluxapyroxad	0.010
fuberidazole	0.010
furalaxyl	0.010
furametpyr	0.010
hexaconazole	0.010

ANALYTE	NRS LOR (mg/kg)
imazalil	0.010
ipconazole	0.010
iprobenfos	0.010
iprodione	0.010
iprovalicarb	0.010
isoprothiolane	0.010
isopyrazam	0.010
kresoxim-methyl *Commodities of animal origin: Sum of α-(p-hydroxy-o-tolyloxy)-o-tolyl(methoxyimino) acetic acid (E)-methoxyimino[α-(o-tolyloxy)-o-tolyl] acetic acid expressed as kresoxim-methyl* *kresoxim-methyl (parent)*	 0.010
mandestrobin	0.010
mandipropamid	0.010
mefentrifluconazole	0.010
mepronil	0.010
metalaxyl	0.010
metconazole	0.010
metominostrobin (sum of isomers) *metominostrobin (E)* *metominostrobin (Z)*	 0.010 0.010
metrafenone	0.010
myclobutanil	0.010
nitrothal-isopropyl	0.010
oxadixyl	0.010
oxathiapiprolin	0.010
oxycarboxin	0.010
paclobutrazol	0.010
penconazole	0.010
penthiopyrad *Commodities of animal origin: Sum of penthiopyrad (parent) and 1-methyl-3-(trifluoromethyl)-1H-pyrazol-4-ylcarboxamide expressed as penthiopyrad*	 0.010
picoxystrobin	0.020
prochloraz *Sum of prochloraz and its metabolites containing the 2,4,6-trichlorophenol moiety, expressed as prochloraz* *prochloraz (parent)* *2,4,6-trichlorophenol*	 0.010
procymidone	0.010
propiconazole	0.010
pydiflumetofen	0.010
pyraclostrobin	0.010
pyrimethanil	0.010

ANALYTE	NRS LOR (mg/kg)
pyriofenone	0.010
pyroquilon	0.010
quinoxyfen	0.010
quintozene *Sum of* *quintozene (parent)* *pentachloroaniline* *methyl pentachlorophenyl sulphide* *expressed as quintozene*	0.010
simeconazole	0.010
spiroxamine *Commodities of animal origin: spiroxamine carboxylic acid* *spiroxamine (parent)*	0.010
tebuconazole	0.010
tecnazene	0.010
tetraconazole	0.010
tolclofos methyl	0.010
tolylfluanid	0.010
triadimefon *Sum of* *triadimefon (parent)* *triadimenol (as triadimefon metabolite)* *expressed as triadimefon*	0.010 0.020
triadimenol	0.020
tricyclazole	0.010
trifloxystrobin *Sum of* *trifloxystrobin (parent)* *and its acid metabolite ((E,E)-methoxyimino-[2-[1-(3-trifluoromethylphenyl)-ethylideneaminooxymethyl]phenyl] acetic acid),* *expressed as trifloxystrobin equivalents*	0.010 0.010
triticonazole	0.010
uniconazole-P *Sum of uniconazole-p and its Z-isomer expressed as uniconazole-p* *uniconazole-p (E)*	0.010
vinclozolin	0.010
zoxamide	0.010
HERBICIDES	0.010
acetochlor	0.010
allidochlor	0.010
ametoctradin	0.010
ametryn	0.010
atrazine	0.010
benfluralin	0.010
benoxacor	0.010
bensulfuron-methyl	0.010
bensulide	0.010
bentazone	0.020
bifenox	0.010

ANALYTE	NRS LOR (mg/kg)
bromacil	0.010
bromobutide	0.010
butachlor	0.010
butafenacil	0.010
butamifos	0.010
cafenstrole	0.010
carfentrazone-ethyl	0.010
chlorimuron-ethyl	0.020
chlorotoluron	0.010
chloroxuron *Sum of* *chloroxuron (parent)* *and all metabolites hydrolysed to p-chlorophenoxyaniline* *expressed as chloroxuron*	0.010
chlorpropham	0.010
chlorthal-dimethyl	0.010
clodinafop-propargyl	0.010
clomazone	0.010
cloquintocet-mexyl *Sum of* *cloquintocet mexyl (parent)* *5-chloro-8-quinolinoxyacetic acid* *expressed as cloquintocet mexyl*	0.010
cyanazine	0.010
cyclosulfamuron	0.010
cyhalofop-butyl *Sum of* *cyhalofop-butyl (parent)* *cyhalofop* *and metabolites* *expressed as cyhalofop-butyl*	0.010
desmedipham	0.010
dichlobenil	0.010
diclofop-methyl	0.010
diclosulam	0.010
diflufenican	0.010
dimepiperate	0.010
dimethenamid-P	0.010
diphenamid	0.010
dithiopyr	0.010
esprocarb	0.010
ethalfluralin	0.010
ethofumesate	0.010
ethoxysulfuron *Commodities of animal origin:* *2-amino-4,6-dimethoxypyrimidine, expressed as ethoxysulfuron* *ethoxysulfuron (parent)*	0.010

ANALYTE	NRS LOR (mg/kg)
fenoxaprop-ethyl *Sum of fenoxaprop-ethyl (all isomers) and 2-(4-(6-chloro-2-benzoxazoyloxy)phenoxy)-propanoate and 6-chloro-2,3-dihydrobenzoxazol-2-one, expressed as fenoxaprop-ethyl*	
fenoxaprop-ethyl (sum of isomers)	0.010
fentrazamide	0.010
flamprop-M-methyl	0.010
florasulam	0.020
fluazifop-p-butyl *Sum of fluazifop-butyl, fluazifop and their conjugates) expressed as fluazifop*	
fluazifop-p-butyl (unconjugated)	0.010
fluazifop-p (unconjugated)	0.020
flufenacet	0.020
flumiclorac-pentyl	0.010
flumioxazin	0.010
fluometuron *Sum of fluometuron (parent) and 3-trifluoromethylaniline expressed as fluometuron*	0.010
fluridone	0.010
halauxifen-methyl-A *Commodities of animal origin: 4-Amino-3-chloro-6(4-chloro-2-fluoro-3-hydroxphenyl)-pyridine-2-carboxylic acid, expressed as halauxifen-methyl*	
halauxifen-methyl (parent)	0.010
haloxyfop *Sum of haloxyfop, its esters and conjugates expressed as haloxyfop*	
haloxyfop-methyl	0.010
hexazinone	0.010
imazamethabenz-methyl	0.010
inabenfide	0.010
indanofan	0.010
indaziflam	0.010
ioxynil	0.020
isoproturon	0.010
isoxaben	0.010
karbutilate	0.010
lactofen	0.010
lenacil	0.010
linuron *Sum of linuron (parent) 3,4-dichloroaniline expressed as linuron*	0.010
mefenpyr-diethyl *Commodities of animal origin: Sum of mefenpyr-diethyl (parent) and 1-(2,4-dichlorophenyl)-5-ethoxycarbonyl-5-methyl-2-pyrazoline-3-carboxylic acid expressed as mefenpyr-diethyl*	0.010
metamitron	0.010

ANALYTE	NRS LOR (mg/kg)
methabenzthiazuron	0.010
metobromuron *Commodities of animal origin: Sum of 4-bromo-2-hydroxyphenylurea (CGA 72905) and 4-bromophenyl urea (CGA18237), expressed as metobromuron* *metobromuron (parent)*	0.010
metolachlor	0.010
metribuzin	0.010
monolinuron	0.010
napropamide	0.010
nitrofen	0.010
norflurazon	0.010
oryzalin	0.010
oxadiazon	0.010
oxyfluorfen	0.010
pendimethalin	0.010
picolinafen *Commodities of animal origin: Sum of picolinafen (parent) and 6-[3-trifluoromethyl phenoxy]-2-pyridinecarboxylic acid*	0.010
piperophos	0.010
pretilachlor	0.010
prometryn	0.010
propachlor *Sum of propachlor and metabolites hydrolysable to N-isopropylaniline, expressed as propachlor* *propachlor (parent)* *N-isopropylaniline*	0.010
propaquizafop *Sum of propaquizafop (parent) and acid and oxophenoxy metabolites, measured as 6-chloro-2-methoxyquinoxaline expressed as propaquizafop*	0.020
propazine	0.010
propham	0.010
propyzamide	0.010
pyraflufen-ethyl *Sum of pyraflufen-ethyl (parent) and its acid metabolite (2-chloro-5-(4-chloro-5-difluoromethoxy-1-methylpyrazol-3-yl)-4-fluorophenoxyacetic acid)*	0.010
pyributicarb	0.010
pyriftalid	0.020
pyriminobac-methyl (sum of isomers)	
pyriminobac-methyl (E)	0.010
pyriminobac-methyl (Z)	0.010
pyroxsulam	0.010
quizalofop-ethyl *Sum of quizalofop acid and other esters, expressed as quizalofop-ethyl*	
quizalofop-ethyl (parent)	0.010

ANALYTE	NRS LOR (mg/kg)
saflufenacil	0.010
sebuthylazine	0.010
simazine	0.010
simetryn	0.010
sulfentrazone	0.020
tebuthiuron *Sum of tebuthiuron, (parent) hydroxydimethylethyl N-dimethyl and hydroxy methylamine metabolites expressed as tebuthiuron*	0.010
terbacil	0.010
terbumeton	0.010
terbuthylazine	0.010
terbutryn	0.010
thenylchlor	0.010
thiazopyr	0.010
triallate *Sum of triallate (parent) 2,3,3-trichloroprop-2-ene sulfonic acid (TCPSA) expressed as triallate*	0.010
triasulfuron	0.010
trifloxysulfuron sodium	0.010
trifluralin	0.010

** laboratories should be aware that heptachlor epoxide exists as two isomers (exo and endo). Samples in the current PT programs will be spiked with the exo isomer.

Specification of PT Samples

PT will not be available for this program.

Program 316: Metals in seafood

ANALYTE	NRS LOR (mg/kg)
antimony (Sb)	0.010
cadmium (Cd)	0.010
chromium (Cr)	0.050
lead (Pb)	0.010
mercury	0.010
arsenic (As) (total)	0.050
arsenic (As) (inorganic)	0.050

Specification of PT Samples

PT relating to Program 16 will encompass those analytes relevant to cover the PT requirements for the other animal metal programs as well (See *'Relevant participation for NRS contract laboratories – special cases'*, section for more information).

Note: Participation in Program 16 PT will be required for laboratories contracted for Programs 16 (including horse muscle samples), 206, and 316.

The laboratory contracted for this program may only seek the analytes relevant to Program 316 (Sb, Cd, Cr, Pb, Hg, As) included in Program 16 PT and therefore only be assessed against those analytes. Refer to Program 16 section for further details on the Specification of Program 16 PT samples.

Program 317: Dyes in seafood

ANALYTE	NRS LOR (mg/kg)
malachite green	0.00025
leucomalachite green	0.00044
crystal violet	0.00014
leucocrystal violet	0.00050
brilliant green	0.00022
methylene blue	0.0011
victoria blue B	0.00066
victoria blue R	0.00025
victoria pure blue BO	0.0011

PT will not be available for this program.

Program 333: Quinolones and Fluoroquinolones in seafood

ANALYTE	NRS LOR (mg/kg)
ciprofloxacin	0.0020
danofloxacin	0.0020
difloxacin	0.0020
enrofloxacin	0.0020
flumequine	0.0020
gatifloxacin	0.0020
levofloxacin	0.0020
lomefloxacin	0.0020
marbofloxacin	0.0020
moxifloxacin	0.0020
nalidixic acid	0.0020
norfloxacin	0.0020
orbifloxacin	0.0020
oxolinic acid	0.0020
sarafloxacin	0.0020

PT will not be available for this program.

MILK PE PROGRAMS

The tests specified for the milk programs in this handbook have been developed at the request of Dairy Food Safety Victoria (DFSV) in support of the Australian Milk Residue Analysis (AMRA) Survey. Their prime purpose is to monitor the performance of AMRA contract laboratories. In addition, the PE Program is used to establish a body of objective laboratory performance information that may be used for a range of purposes including engagement by DFSV of laboratory services under term contracts.

Given the limited number of laboratories with expertise in the field of testing milk for chemical residues, laboratories with an interest in this area are encouraged to participate in the milk PE programs.

A report will be published in which laboratories are identified only by randomly allocated letter code. The individual assessments will be advised to the laboratories concerned.

The AMRA Survey Coordinator liaises closely with the NRS in this laboratory PE program. Further information can be obtained from:

Karina Budd
Director, RC-LPE
National Residue Survey
Ph: (02) 6272 5795
karina.budd@agriculture.gov.au

Winnie Wong
Information Analyst Dairy Food Safety
Dairy Food Safety Victoria
Ph: (03) 9810 5903
wwong@dairysafe.vic.gov.au

Program No	**Program Name**
PROGRAM 501	ANTIMICROBIALS in MILK
PROGRAM 509	PESTICIDES in MILK
PROGRAM 511	BENZIMIDAZOLES in MILK
PROGRAM 518	AFLATOXINS in MILK

Note: From March 2023 the matrix used in the Milk PT Programs will be full cream, homogenised, pasteurised milk.

Program 501: Antimicrobials in milk

ANALYTE	AMRA LOD (screening) (mg/kg)
AMINOGLYCOSIDES	
dihydrostreptomycin	0.10
neomycin	0.10
streptomycin	0.10
gentamycin	0.020
BETA LACTAMS	
amoxicillin	0.0040
ampicillin	0.0040
benzyl G penicillin	0.0010
cloxacillin	0.010
CEPHALOSPORINS	
ceftiofur *(desfuroylceftiofur)*	0.050
cefuroxime *Inhibitory substance, identified as cefuroxime*	0.020
cephalonium *Inhibitory substance, identified as cephalonium*	0.010
cephapirin *cephapirin and des-acetylcephapirin, expressed as cephapirin*	0.0040
cephazolin	0.0040
MACROLIDES	
erythromycin	0.040
lincomycin	0.050
oleandomycin	0.050
tilmicosin	0.020
tylosin	0.050
TETRACYCLINES	
chlortetracycline *(Inhibitory substance, identified as chlortetracycline)* *chlortetracycline* *4-epichlortetracycline*	0.050
oxytetracycline *(Inhibitory substance, identified as oxytetracycline)* *oxytetracycline* *4-epioxytetracycline*	0.050
tetracycline *(Inhibitory substance, identified as oxytetracycline)* *tetracycline* *4-epitetracycline*	0.050
SULFONAMIDES	
sulfadiazine	0.050
sulfadimidine (sulfamethazine)	0.050
sulfadoxine	0.050
sulfatroxazole	0.050

Specification of PT Samples

The program will involve 5-7 samples and comprise approximately 100mL of milk in glass containers (replicate samples will be provided if required).

Program 509: Pesticides in milk

ANALYTE		AMRA LOR (mg/kg)
ORGANOCHLORINES		
aldrin and dieldrin	*Sum of*	
	aldrin (HHDN)	0.030F
	dieldrin (HEOD)	0.090F
chlordane	*Sum of*	
	chlordane (cis)	0.030F
	chlordane (trans)	0.030F
	oxychlordane	0.030F
DDT	*Sum of*	
	DDT (p,p')	0.090F
	DDT (o,p')	0.090F
	DDE (p,p')	0.080F
	DDD (p,p ')	0.050F
endosulfan	*Sum of*	
	endosulfan (alpha)	0.050F
	endosulfan (beta)	0.080F
	endosulfan sulfate	0.080F
HCB	*(Hexachlorobenzene)*	0.020F
heptachlor	*Sum of*	
	heptachlor (parent)	0.030F
	*heptachlor epoxide***	0.030F
HCH *(BHC)*	*Sum of isomers of 1,2,3,4,5,6-hexachlorocyclohexane other than lindane (gamma-HCH)*	
	HCH (alpha)	0.040F
	HCH (beta)	0.080F
	HCH (delta)	0.0080F
lindane	*(gamma-HCH)*	0.0050F
ORGANOPHOSPHATES		
bromophos ethyl		0.0020
chlorfenvinphos	*Sum of E- & Z- isomers*	0.040F
chlorpyrifos		0.020F
chlorpyrifos-methyl		0.020F
coumaphos	*Sum of*	
	coumaphos (parent)	0.080F
	coumaphos (oxygen-analogue)	0.010F
	expressed as coumaphos	
diazinon		0.030F
dichlorvos		0.0020
ethion		0.050F
fenchlorphos		0.0090
fenitrothion		0.030F

ANALYTE		AMRA LOR (mg/kg)
fenthion	*Sum of*	
	fenthion (parent)	0.0060
	fenthion sulfoxide	0.025
	fenthion sulfone	0.016
	fenthion oxygen-analogue	0.012
	fenthion oxygen-analogue sulfoxide	0.025
	fenthion oxygen-analogue sulfone	0.015
	expressed as fenthion	
malathion (maldison)		0.10F
parathion methyl		0.0010
pirimiphos methyl		0.0030
SYNTHETIC PYRETHROIDS		
cyfluthrin	*Sum of isomers*	0.010
cyhalothrin	*Sum of isomers*	0.20F
cypermethrin	*Sum of isomers*	0.30F
deltamethrin		0.0070
fenvalerate	*Sum of isomers*	0.0050
	esfenvalerate	0.0050
flumethrin	*Sum of isomers*	0.015
permethrin	*Sum of isomers*	0.0080

** laboratories should be aware that heptachlor epoxide exists as two isomers (exo and endo). Samples in the current PT programs will be spiked with the exo isomer.
Key: F – reported on a milk fat basis

Specification of PT Samples

The program will involve 5-7 samples and comprise approximately 200mL of milk in glass containers. Residue definition analytes to be reported individually (see Appendix 4).

Program 511: Benzimidazoles in milk

ANALYTE	NRS LOR (mg/kg)
albendazole *Sum of*	
albendazole (parent)	0.0050
albendazole sulfoxide	0.0050
albendazole sulfone	0.0050
albendazole sulfone amine	0.0050
expressed as albendazole	
clorsulon	0.0050
febantel	0.0050
fenbendazole	0.0050
mebendazole	0.0050
monepantel *(monepantel sulfone)*	0.0050
nitroxynil	0.0050
oxfendazole (fenbendazole sulfoxide)	0.0050
praziquantel	0.0050
thiabendazole *Sum of*	
thiabendazole (parent)	0.0050
5-hydroxythiabendazole	0.0050
expressed as thiabendazole	

Specification of PT Samples

The program will involve 3-4 samples and comprise approximately 100mL of milk in glass containers. Residue definition analytes to be reported individually (see Appendix 4).

Program 518: Aflatoxin M1 in milk

ANALYTE	NRS LOR (mg/kg)
aflatoxin M1	0.000020

Specification of PT Samples

The program will involve 3-4 samples and comprise approximately 100mL of milk in glass containers. Residue definition analytes to be reported individually (see Appendix 4).

APPENDIX 1: LPE COMMITTEE – MEMBERSHIP

LPE Committee member	Organisation	Position
Karina Budd (Chair)	NRS	Director, RC-LPE
Dr Meg Croft	National Measurement Institute	Principal Chemist
Mr Graham Roberts	ChemRes Technical Services	Consultant Chemist
Technical / scientific input		
Susan Maddalena	NRS	Assistant Director, RC-LPE
Michelle Sleiman	NRS	Assistant Director, RC-LPE
Rohan Weragoda	NRS	Senior Project Officer, RC-LPE
Kartika Raju	NRS	Project Officer, RC-LPE
Rajeewa Malluwa Wadu	NRS	Project Officer, RC-LPE
	Proficiency Testing Australia	Statistician

The LPE Committee's primary function is to examine and review analytical proficiency test results, statistical data as well as the other records and relevant information to clarify and rank laboratory performance. Members of the LPE Committee may also provide feedback on the planning and implementation of PT tests.

APPENDIX 2: NRS' RELATIONSHIP WITH NATA

The NRS is not a laboratory accrediting body. The NRS recognises and supports the role of NATA as the principal agent of laboratory accreditation in Australia, incorporating in its accreditation arrangements the relevant nationally and internationally defined standards. As an accredited PT provider routinely conducting PT schemes, the NRS may provide PT results reported by accredited participants to the relevant accreditation body – NATA mostly – once our PT programs are complete.

The NRS does not require a laboratory to hold, or be seeking, NATA accreditation either in the particular test or in chemical residue analysis generally, as a precondition of participation in NRS PT. Where appropriate, NRS PT results obtained by the laboratory may assist in the documentation of its application for accreditation. NATA may also use information obtained via its involvement in the NRS PT program to follow up a NATA accredited laboratory's poor performance.

APPENDIX 3: USE OF PT RESULTS FOR NON-NRS PURPOSES

The NRS understands that, in the absence of other recognised measures of a laboratory's current performance in particular chemical residues tests, the laboratory (or a potential client) will, in some instances, seek to use performance in NRS PT for that purpose. The NRS accepts no responsibility for the outcome of such an approach, and encourages the parties to any such arrangement to address the following issues in their negotiations:

1. The NRS programs for which tests are undertaken are as specified in this Handbook, or subsequent revisions. Being designed specifically to meet NRS needs, they may not match the needs of other potential users of similar tests.
2. Experience in the NRS program, and elsewhere, shows that a laboratory's proficiency demonstrated in one type of test cannot be taken to extend to other tests. Our program currently includes some laboratories that perform very well in a wide range of tests; others perform well in some and poorly in others.
3. Apparent poor performance in a recent test does not necessarily reflect poorly on a laboratory - there have been such cases where a laboratory is trying methods which are ambitious, and in some cases novel on the Australian scene. Developmental work is highly valued by the NRS; we welcome the use of our PT program for such purposes.
4. The range of analytes specified by the NRS in some multi-residue screens exceeds the range of interest to some of the laboratories that take part. The NRS assessment of overall performance is likely to under-rate performance in the more limited group of residues of interest to the laboratory. To deal with this we advise laboratories to identify analytes 'not sought', when submitting their results.
   Where not all analytes spiked in a round are sought by the laboratory, a performance ranking of ***NOT ASSESSABLE*** will be allocated to the laboratory for this round. The participating laboratory may still wish to direct third parties or clients to the laboratory's performance score for those individual analytes sought and assessed.
5. The fact that a laboratory takes part in a particular NRS PT reflects in no way, good or bad, on its capacity to do the test. Any potential client of the laboratory wishing to draw on NRS test performance should seek from the laboratory, at least:

- the specification of the test in the NRS Proficiency Tests Handbook
- the NRS letter reporting back to the laboratory its identifying code and the overall assessment of performance against NRS requirements
- any other clarifying or qualifying comments from the NRS to the laboratory
- copy of the PT report (or relevant sections in the PT report).

6. The NRS is willing, at any time, to discuss with a 'third party client' the general considerations surrounding the PT program in general or any particular test. The NRS does not make information on a specific laboratory's performance available to third party clients without the laboratory's consent.

APPENDIX 4: TECHNICAL ISSUES REGARDING TESTING AND REPORTING OF RESULTS

Recoveries

- Results returned by laboratories in NRS PT programs must be reported 'corrected for recovery' with the recovery used in the calculation also reported.
- While the NRS Program Specifications in this handbook do not state a 'preferred range of recovery' for the particular test, a range somewhere within the limits of 70 - 110% is typically expected. However, this should only be taken as indicative, reflecting the recoveries achieved in recent times by Australian laboratories reporting results in most of the tests.
- NRS assessments of PT and check sample results will not penalise laboratories for reported recoveries, which are slightly outside the preferred range. However, a laboratory tendering for NRS contract work with an analytical method which consistently achieves recoveries outside the 'preferred range' may be viewed as deficient, in this respect, relative to laboratories with methods delivering results within the range.

LOD and LOR

PT samples may be spiked at concentrations below the NRS specified LOR but only in cases where it is known that laboratory method LORs are likely to be significantly lower than the NRS specified values and the spiked value is above the generally accepted LOD for the analyte/matrix combination. PT samples may also be spiked as high as several times the maximum residue limit (MRL) for the analyte/matrix combination. Where there is no MRL set, any detection of the analyte in that matrix is a presumptive contravention as there is no defined permissible concentration for that product/residue combination and proficiency samples may be spiked as high as 10 – 20 times the LOR in such instances (see also Confirmation of the identity of detected analytes).

Reporting results

PT sample results should generally be reported to two significant figures. (e.g. 1.1, 0.11, 0.011, 0.0011, 0.00011). Laboratories should be aware that reporting to less than two significant figures is generally detrimental to their assessment, similarly excessive significant figures is also viewed negatively. It is recommended that laboratories report to the number of significant figures justified by the uncertainty associated with a result.

Results should be reported electronically and in mg/kg units (mg/L for urine).

The NRS report will record cases of analytes 'not sought', if notified of this when results are submitted.

Extensions for the submission of results may be granted to laboratories, the appropriateness of granting the extension being assessed by RC-LPE on a case-by-case basis. Late results may be accepted if an extension has been granted and results are received before the assessment process has commenced.

Residue definitions

In cases where the given residue definitions for a particular parent compound involves a number of metabolites / isomers, and laboratories are able to detect those individual components, laboratories should not report the sum of the metabolites/isomers but rather report each individual analyte detected.

For synthetic pyrethroids (SPs), individual isomers should be reported where possible and in a way that would reflect the composition of the likely isomer enriched commercial product.

For example, if all relevant peaks are detected in a GC run in the retention time window of cypermethrin, then the result should be reported as cypermethrin (taken as the sum of isomers). However, if only a single major peak is detected in the same retention time window which is known to correspond to α-cypermethrin, then α-cypermethrin should be reported and NOT cypermethrin.

Unidentified analytical and biological responses (UARs and UBRs)

Where unidentified analytical responses (UARs) or unidentified biological response (UBRs) are detected during the course of analysing NRS PT samples, they should be reported to NRS along with the PT results. UARs / UBRs should only be reported if they are known not to be due to laboratory artefacts and their instrumental or biological response is significant e.g. 3 x the lowest reliable response observed for the least sensitive analytes covered by the method. If the compound, or compound class, to which the UAR / UBR response can be attributed has been identified it should be reported, otherwise their presence should be indicated by simply reporting either UAR or UBR for the specific PT sample.

Measurement uncertainty

Estimates of the measurement uncertainties associated with PT results should be reported, where available. These values should be determined at the 95% confidence level and the concentration to which the measurement uncertainty applies should also be reported. Reported measurement uncertainty estimates will be published in the relevant PT reports. All laboratories subsequently contracted by NRS, and accredited for a particular test, would be expected to have fully implemented procedures to determine the measurement uncertainty associated with their results.

Confirmation of the identity of detected analytes

There have been some significant changes in this version regarding the requirements for confirmation of the identity of detected analytes. We ask that contract laboratories review these changes and implement as soon as possible. The expectation is that by 1 July 2024 they would be fully implemented.

Laboratories participating in NRS PT with a view to securing a NRS testing contract should be aware that NRS requires the confirmation of the identity of detected analytes in NRS samples and corresponding PT samples, to be consistent with the requirements for the confirmation of analytes in animals and animal products as outlined in Section 1.2.4 in European Commission Decision 2021/808/EC.

Confirmatory methods for Group A and where possible Group B analytes must be based on mass spectrometry. While the EU Regulations relate to the confirmation of residues in animals and animal products, they also form the basis for the confirmation of all chemical residues detected in ALL NRS programs irrespective of the matrix.

A full copy of this document can be made available from RC-LPE staff, in electronic form on request. Hence, for NRS contract laboratories and tendering laboratories, all analytes reported in PT results must be confirmed in line with Section 1.2.4 in European Commission Decision 2021/808/EC.
(https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32021R0808&from=EN)

The chemicals that the 2021/808/EC document refers to as being specified in Annex 1 of EU Regulation 2022/1644/EC on *Specific requirements for the performance of official controls on the use of pharmacologically active substances authorised as veterinary medicinal products or as feed additives and of prohibited or unauthorised pharmacologically active substances and residues thereof*

(https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32022R1644&from=EN) as Group A and Group B are of relevance to NRS programs listed below.
Also listed in the Group B table below are the non-meat NRS programs for which the 2021/808/EC criteria will also apply.
Annex 1 of EU Regulation 2022/1644/EC also refers to EU Regulation 37/2010/EC for further detail on Group A and B compounds.
(https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32010R0037&from=EN).

Group A# chemicals and relevant NRS programs

Chemicals	**EU Group**	**NRS Program number**
stilbenes, trenbolone*, zeranols*	A1(c), A1(d)	6, 306
androgenics	A1(c)	20, 306
beta-agonists*	A1(e)	7
chloramphenicol	A2(a)	3, 203, 3E
nitrofurans	A2(b)	4, 4I, 204
nitroimidazoles*: dimetridazole, metronidazole, ronidazole	A2(c)	5A
dyes	A3(a)	317
plant protection products defined in EU Regulation 1107/2009, biocides in EU Regulation 528/2012	A3(b)	8, 12, 28, 37
some antimicrobials / quinolones	A3(c)	1, 5B, 33, 201, 333
coccidiostats and other antiparasitic agents	A3(d)	27
some anti-inflammatory substances, sedatives and any other pharmacologically active substances	A3(f)	23, 36, 38
corticosteroids	A3(f)	35

from Annex 1 of EU Regulation 2022/1644/EC, Group A - Prohibited or unauthorised pharmacologically active substances in food-producing animals and
Annex Table 2 of EU Regulation 37/2010/EC, Prohibited substances
* Note: some chemicals under these groups are registered in Australia for use on some species

Group B^ chemicals and relevant NRS programs

Chemicals	**EU Group**	**NRS Program number**
some antimicrobials / quinolones	B1(a)	1, 5A, 5B, 201 33, 333
thiamphenicol, florfenicol (excluding chloramphenicol)	B1(a)	3, 203, 3E
pesticides, herbicides	Pesticides	8, 37, 42, 49, 49H, 49I, 169, 208
cyromazine, dicyclanil	B1(b)	10
benzimidazoles	B1(b)	11
macrocyclic lactones, spinosyns	B1(b)	12
closantel, imidazothiazoles, triclabendazole	B1(b)	11, 15
metals	Contaminant	16, 46, 156, 206, 316
NSAIDs	B1(d)	23
anticoccidials authorised for use:	B2	27
benzoyl ureas	B2(f)	28
corticosteroids	B1(d)	35
some anti-inflammatory substances, sedatives	B1(e)	23, 36, 38

^ from Annex 1 of in EU Regulation 2022/1644/EC, Group B - Pharmacologically active substances authorised for use in food-producing animals and
Annex Table 1 of EU Regulation 37/2010/EC - Allowed substances

Meat fat samples

The NRS requires that, where meat fat is the matrix for the random monitoring program, the laboratory should test and report the analyte concentration on an 'as received' basis for Program 12 and analyte concentrations in the lipid fraction (rendered fat) for NRS Programs 8 and 28. All NRS fat PT samples will have been rendered on preparation and should be analysed on an 'as received' basis.

Routine NRS fat samples, and incurred fat samples which may be presented from time to time in NRS inter-laboratory exercises, may be drawn from any area of the carcase, combined with uncertain fractions of water and other tissue. The test results should be based on the pure fat, rendered or solvent extracted, to give a calculated concentration in the fat. This guideline applies also to samples analysed in the Department of Agriculture, Fisheries and Forestry Meat Export Program-coordinated targeted testing.

APPENDIX 5: RAISING A QUERY OR SUBMITTING A COMPLAINT

We understand that the operations of the NRS RC-LPE section are important to participating laboratories both for their potential commercial significance to a laboratory seeking work on the strength of its performance and for their relevance to the sense of professional standing among the laboratory staff taking part.

We seek at all times to perform with accuracy, fairness and courtesy, keeping laboratories informed of our future program through the Handbook, occasional emailed notifications and through phone conversations. In the course of PT programs, and upon their completion, we seek to report in an informative and timely fashion.

However, in a complex program, working with limited resources, we do have problems from time to time and you may feel that we have not met reasonable expectations in some respect. In the past laboratories may have raised such matters as:

- non-delivery or mis-delivery of samples, information etc.
- performance gradings in PT assessments
- sample or paperwork condition upon arrival at the laboratory
- NRS errors in reading or transcribing data reported by the laboratory
- errors or inadequacies in the presentation of PT assessments and reports

We will happily respond appropriately to any matters, when they are raised with us. On past experience the response may require no more than correction of a delivery fault or clarification of a misunderstanding. We are willing, if appropriate, to revise assessments and send out corrected documentation or take other action as required.

Our commitment to respond:

In the first instance you should raise the matter of concern by phoning:

Contact person	Contact phone number	Area of concern
Karina Budd	(02) 6272 5795	technical laboratory issues, residue chemistry, proficiency test issues of principle or interpretation, technical laboratory issues, specifically milk and horticulture programs but also other PT programs in general, timing, documentation

We will seek to answer your concerns as promptly as possible. Where necessary we will refer your query/complaint to the LPE Committee, or to the Director of NRS RC-LPE.

Abbreviations

Abbreviation	Definition
AMRA	Australian Milk Residue Analysis Survey
CV	coefficient of variation
DFSV	Dairy Food Safety Victoria
EU	European Union
GC	gas chromatography
ILCSS	inter-laboratory check sample scheme
LOD	limit of detection
LOR	limit of reporting
LPE	Laboratory Performance Evaluation
MIT	Microbial Inhibition Test
MRL	maximum residue limit
NARM	National Antimicrobial Residue Minimisation
NATA	National Association of Testing Authorities
NMI	National Measurement Institute
NORM	National Organochlorine Residue Management
NRS	National Residue Survey
NSAIDs	nonsteroidal anti-inflammatory drugs
PE	performance evaluation
PT	proficiency test
PTA	Proficiency Testing Australia
RC-LPE	Residue Chemistry – Laboratory Performance Evaluation
UAR	unidentified analytical response
UBR	unidentified biological response