Review of Technical Market Access Issues Relevant to Australian Seafood Industry Members of the Australian Seafood CRC

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Executive Summary

The Australian Seafood CRC is commissioning a number of critical reviews of technical market access support needs to inform the development of its Market Security Program. This information is to provide a basis for determining where to invest in research and development and how to achieve the best and most effective return on this investment.

ToR 1. Identify current key markets for Australian seafood and the current technical requirements for market entry.

- Australia's edible seafood exports are worth $1.2B annually, with a further $300M of non-edible seafood products exported.
- Over 90% of Australian seafood exports (by value) are concentrated in six main markets: Hong Kong, Japan, United States, China, Taiwan and Singapore. Each of these markets operate their own statutory frontier border inspection programs to assess compliance with internal domestic food safety standards.
- Less than 10% of Australian product (by value) is exported to the European Union (EU).
- One limitation of this information gathering system is that national data recording systems do not allow identification of aquaculture vs. wild capture product in export data statistics. Additionally, species specific data is not readily available by origin and export destination.
- Approximately 25% of all seafood export data is not available due to industry confidentiality restrictions on publications.
- The SARDI Market Access Guide project (SIDF 2004/401) is a key national industry resource for current technical requirements for market entry. It currently informs testing requirements, MRLs, equivalence of Australian and international MRLS and new emerging requirements such as traceability. The use of residues as technical non-tariff trade barriers is growing. The expansion of the detention policies of the EU for cadmium in Australian prawns to other markets such as China is one trend highlighted in non-tariff deterrents to trade.
- New markets are emerging for aquaculture finfish, such as barramundi, into Hong Kong and Southern Bluefin tuna into China.
- Country specific technical market access information is seldom available in the public domain at the level of detail required to assist Australian seafood exporters exploit new or existing markets. Most of the information gathered in project 2004/401 has been gathered during Industry funded or supported overseas travel to these markets.

ToR 2. Identify and detail research and development work being undertaken in key markets in relation to food safety and product integrity that may impact on Australian seafood exporters.

- The European Initiative for Sustainable Development in Agriculture began in 2001 and is now active in France, Germany, Italy, Luxembourg, Sweden, the United Kingdom, Austria and Hungary (www.sustainable-agriculture.org). The program takes into account social and environmental sustainability including water, human and social capital, energy usage, animal welfare, biodiversity and waste management in the production of foods. This work has the potential to disadvantage Australian exporters due to the shipping distance to food markets in the EU. On the other hand, it may help to differentiate Australian product in the EU market through other environmental and social criteria such as the use of renewable energy and sustainable fishing practices etc. The use of eco-friendly biodegradable packaging will also help reduce the carbon score. This provides Australian exporters with multiple options they can use to reduce their carbon score throughout the production and supply chain.

- Tesco supermarkets in Europe will begin labelling seafood product with a carbon score from 2012, this will be a mandatory program for suppliers (http://www.tesco.com/climatechange/). There will be challenges for Australian exporters to develop the necessary record keeping systems to validate these purchasing criteria.
- The development of real time traceability systems will allow verification of end point needs such as carbon footprint scores and differentiation of product in the EU market with competitor products. The EU defines traceability in Directive 178/2002 as "…the ability to trace and follow a food, feed, food-producing animal or substance intended to be, or expected to be incorporated into a food or feed, through all stages of production, processing and distribution."
- Laboratory capability in Australia and New Zealand is strong in traditional metallic residues but less well developed in terms of veterinary therapeutics including growth steroids, anthelmintics, stilbenes, dyes and agricultural chemicals for seafood products. The organo metallic elements such as methylmercury, inorganic arsenic and the alkyl tins are not well represented in Australian laboratories. The absence of accredited laboratory capability for measurement of these residues may disadvantage exporters of product through being unable to demonstrate compliance with importing country's national standards.
- Accreditation providers do not use consistent nomenclature when issuing certification to individual laboratories in terms of specific compounds and matrices covered by the accreditation. Some laboratories for instance are accredited using generic descriptor terms such as for "organochlorine pesticides" while other laboratories are accredited for individual pesticides only such as DDT.
- The development of more rigorous food safety standards such as in Japan has led to greater scrutiny of products entering that market. More recently Japanese companies have been requesting mercury test results for Australian farmed SBT entering Japan.
- The Japanese Food Safety Commission now has the responsibility for validation of MRLs (over 800) for the Japanese Ministry of Health, Labour and Welfare established in 2006 under the *Positive List System*. Australia has been involved in this process to harmonise MRLs for non-seafood agricultural commodities.
- The ongoing dispute between China and the US over residue violations in seafood products will probably see the development of more rigorous port of entry testing in China for imported foods.
- In Hong Kong the development of a Statutory Competent Authority for food safety will lead to greater scrutiny of product entering this key market for Australian seafood exporters.
- In China the relinquishing of State Control between the Chinese Ministry of Health and the Ministry of Agriculture to the State Food and Drug Administration (SFDA) is occurring. This may see additional inspection requirements being imposed on imported seafood in response to risk assessments being conducted by the SFDA.

- Australia's negotiations with China and Japan on Free Trade Agreements have not yet considered equivalence recognition of food safety standards for food products in trade between the two countries. There has been no formal study on the equivalence of Chinese and Australian food safety standards for seafood. Chinese food safety standards are set nationally and provincially with little transparency as to application for which seafood type.
- The European Union delegation of its responsibilities for review and approval of third party countries residue control programs for accessing the EU market to Ireland has led to stricter interpretation of EU standards and mandatory testing requirements for Australian aquaculture exporters.
- The accessibility of information from other countries is often limited. WTO notifications may be issued advising of a change; however the detailed technical information is often not available in English or only available in hard copy format.
- There are two main laboratory accreditation providers, one an Australian industry association and the other a New Zealand Government Statutory. Both schemes mutually recognise each other. Additional recognition of the laboratory by major markets including Japan, EU and the US has been obtained by some providers.
- AQIS issue certification to laboratories to conduct testing of imported seafood products for assessment of compliance with FSANZ standards. This certification allows laboratories to assess compliance with non-FSANZ standards set by AQIS such as for malachite green.
- An evaluation checklist has been prepared summarising key requirements and performance indicators to consider when selecting a laboratory for market access testing services. This checklist has been used to evaluate services at the WA Chemistry Centre in Perth.

ToR 3. Identify and detail work being done, or being proposed, internationally by industry or governments in relation to seafood safety and product integrity.

- There are variable levels of public access to international food safety standards. Some countries do not have a national Competent Authority (such as the United Arab Emirates) or do not specifically regulate seafood products (such as Thailand). Other countries use general prohibition clauses in national food standards for agricultural and veterinary chemical residues in foods. The application of these standards to domestic origin vs. imported product is often variable (such as in China). Access to very specific detailed technical knowledge is seldom available in the public domain, but has been sourced from personal contact with these countries through professional networks.
- Some countries such as New Zealand, Japan and the EU have default Maximum Residue Limits (MRLs) for compounds with no specific MRL in a defined matrix. Australia does not. This disadvantages Australian aquaculture producers who may have a trace amount of an agricultural or veterinary chemical present in a product which means that the seafood cannot legally be sold in Australia.
- The ASEAN (Malaysia, Singapore, Thailand and Vietnam) group of nations in our region is proposing to set up a series of national fishery reference laboratories for fulfilling EU market access testing requirements (chemical and microbiological). These laboratories will be sponsored and administered by the EU. This laboratory capability will have an impact on Australian exporters as the level of testing undertaken by competitor nations will increase and have full market recognition by the EU.

- Market access requirements, such as traceability, will continue to emerge in addition to changes to regulatory limits (MRLs). Traceability models have been delegated by the EU to Denmark to develop for all EU member nations' benefit. Other markets such as Japan are developing seafood traceability systems for product differentiation purposes. Australia does have FSANZ traceability standards which have been modelled on the US FDA system but do not meet the stricter EU model.
- Registration of veterinary drugs in Australia through the APVMA requires risk assessment processes and validation of administration guidelines in aquacultured fish. The national aquaculture industry has chosen to seek minor use permits for several veterinary drugs for use in domestic and exported products. A minor use permit permits a residue of the veterinary drug to be present in product sold domestically or exported. Off label prescribed veterinary drugs are not permitted to leave a residue in the treated seafood.

ToR 4. Investigate and detail current Codex and other international activities that may influence the technical requirements of Australia's key markets.

- Codex Alimentarius is leading a series of international activities on microbiological and chemical hazards including mercury, dioxins, PCBs and marine *Vibrio spp*. Source directed measures are being proposed for some contaminants such as dioxins and PCBs in aquaculture feeds. Australia is developing national stockfeed standards including for aquaculture feeds. Currently stockfeed safety is managed individually by each State and Territory Government.
- Classification of agricultural and veterinary chemicals varies between countries. In some countries some pesticides may be registered as veterinary medicines meaning they are regulated as crop protection chemicals but may be used in aquaculture as a veterinary medicine in another country. This may cause conflicting interpretations of overseas standards when general prohibitions on presence of residues of veterinary medicines are used in food legislation for imported products. Codex is moving towards harmonisation of these issues internationally for product in trade.
- Codex activities are heavily influenced by EU agendas and membership. Many countries such as New Zealand have chosen to expedite the Codex process through direct bilateral agreements with key markets such as the EU. Australia has not taken advantage of this mechanism for seafood exports.

ToR 5. Identify trends in rejections of Australian shipments and reasons for them

- Overall, the single biggest cause of detentions and rejections of Australian seafood is cadmium violations of Northern Australian wild-capture prawns entering the European Union (EU) market (Spain).
- The application of a national EU Maximum Level (ML) for cadmium in crustaceans is at the discretion of the EU member's national Competent Authority.
- The EU definition of crustaceans does not make it clear as to which portion of the prawn the cadmium ML applies.
- A review of the detention data indicates that in excess of 80% of detentions occur on an annual cyclical pattern at two particular periods of the year (this is related to shipping practices and catch seasonality in Australia).

ToR 6. Determine what research and development capabilities exist and the opportunities for collaboration within Australia.

- Australian research providers have a range of expertise that is being engaged to support seafood exporters. These research providers are based across multiple Australian States.

  Capability in Australia and New Zealand
  - Residues and contaminants in seafood
  - Marine bio-toxins in shellfish
  - Marine microbiological hazards in seafood
  - Predictive modelling of chemical and microbiological hazards in seafood for spoilage etc
  - Methods development for microbiological and chemical hazards in seafood
  - Development of MRLs
  - Frontier border inspection methods
  - Sampling methods for compliance testing
  - Review of national public advisory statements
- The WA Chemistry Centre has analytical capability which could fulfil international trade testing obligations for market access. There is a need for validation of methods in seafood matrices and obtaining suitable internationally recognised accreditation for the reporting of these tests for trade purposes. The centre currently has accredited capability to address cadmium in Australian wild capture prawns for the EU market.
- One research provider has delegation from the Australian Quarantine and Inspection Service (AQIS) to undertake sample collection, processing and analyses for EU market access. This provides some opportunity to integrate internal QA verification with mandatory testing required for EU market access.

ToR 7. Identify potential opportunities for collaboration internationally.

- Many overseas Government research institutions within the national Competent Authority are acting in dual purposes roles as R&D providers and quasi official testing service providers for imported seafood products under delegated authority arrangements.

  Capability internationally
  - Advanced ultra trace analytical chemistry
  - MRL development and methods of analysis for compliance testing
  - Sampling methods for frontier border inspection testing
  - Predictive spoilage using microbiological and chemical indicators
  - Marine bio-toxins
  - Residues and contaminants in seafood
  - Country specific national methods of analyses for seafood
  - Integration of research capability within national Competent Authority
  - Development of international Standard Reference Material (SRMs)
  - Laboratory staff training undertaken at international research institutions and overseas Competent Authorities
- Collaboration opportunities exist within many international research institutions and regulatory control agencies to further develop market access for new species of Australian seafood.
- These collaboration partnerships could be set up in parallel with FTA agreement negotiations with countries such as China and Japan.

Description of Project

The Australian Seafood CRC is commissioning a number of critical reviews of technical market access support needs to inform the development of its Market Security Program. This information is to provide a basis for determining where to invest in research and development and how to achieve the best and most effective return on this investment.

The review has been broken into two components which have been commissioned separately to the South Australian Research and Development Institute and to Mr Kevin Shiell (VRS).

Terms of Reference (ToR): SARDI

Technical market access issues

1. Identify current key markets for Australian seafood and the current technical requirements for market entry.
2. Identify and detail research and development work being undertaken in key markets in relation to food safety and product integrity that may impact on Australian seafood exporters.
3. Identify and detail work being done, or being proposed, internationally by industry or governments in relation to seafood safety and product integrity.
4. Investigate and detail current Codex and other international activities that may influence the technical requirements of Australia's key markets.
5. Identify trends in rejections of Australian shipments and reasons for them.

Opportunities for collaboration

6. Determine what research and development capabilities exist and the opportunities for collaboration within Australia.
7. Identify potential opportunities for collaboration internationally.

Each of these ToRs has been individually addressed.

Technical Market Access Issues

Terms of Reference 1: Current Key Markets

Identify current key markets for Australian seafood and the current technical requirements for market entry.

Key Markets for Australian Seafood

A summary of exported wild capture and aquaculture seafood by market destination country is provided in Appendix 1, Table 1.1 in which countries are listed in descending export value.

Value of seafood exports to key markets

- The total value of all Australian seafood exports in 2005/2006 was $AUD 1.2B. The major markets of Hong Kong, Japan, United States, China, Taiwan and Singapore account for approximately 90% of exported Australian seafood by value. High value exported seafood products include wild-caught rock lobster and farmed southern bluefin tuna.
- These data exclude the export value of live seafood, non-edible products (pearls, fish meal, fish oil etc) which amount to approximately $AUD 310M.

ABARE reporting of export data

National seafood export data is tabulated by the Australian Bureau of Agricultural and Resource Economics (ABARE) from a variety of sources including customs and State and Territory records. A summary of national aquaculture and wild capture seafood exports by value and quantity is provided in Appendix 1, Tables 1.2 and 1.3. However, due to current reporting format of ABARE it is not possible to relate figures in Table 1.1 with those in Tables 1.2 and 1.3 (that is you can't tell whether it is wild-caught or aquaculture product).

Market access technical requirements SWOT analysis

A SWOT analysis of key overseas markets is presented by market destination country in Appendix 1, Table 1.4. Technical market access requirements vary from country to country and accessibility of national seafood standards for each country ranges from public internet accessible information to hard copy internal documents. Some countries, such as Japan, rely on a very prescriptive approach to regulating agricultural and veterinary chemicals in seafood products. Other, such as Singapore, use generic bans on the presence of any veterinary drug residues instead of setting individual MRLs for each compound.

Australia does not have a default MRL for agricultural and veterinary chemicals with no specific MRL. New Zealand, Japan and the EU all have default MRLs in their national food standards, providing operational flexibility to their exporters. This means that if there is no Food Standards Australia New Zealand (FSANZ) ML/MRL/ERL set for that commodity and for chemical compound there is no permission for a residue to be found in that commodity.

One issue that covers all markets is the definition of an agricultural or veterinary chemical. In some countries a pesticide may be registered for crop protection purposes, while in another country the same product may be used as a veterinary medicine in aquaculture animals. The problem arises when one country sets a general prohibition for the presence of all veterinary medicines in imported seafood products. In some countries agricultural chemicals may be dual registered as a crop protection pesticide and as a veterinary medicine for use in aquaculture. This may lead to different MRLs for the same compound set in food producing fish as a veterinary medicine and in horticulture crops as a crop protection chemical.

Market Access Guide

The current technical requirements for the top six destination countries are fully documented in the SSA Project, 2004/401: *A Market Access Guide for Seafood Exporters: International Residues Standards*. This project has been collecting in-country information on national Maximum Residue Limits (MRLs), portion to which the MRL applies, species coverage for MRLs, definition of MRLs and additional information such as identification of the national Competent Authority. A summary of the product integrity issues facing exporters to the major export markets are summarised in Appendix 1, Table 1.4.

Market access guide project (SSA)

Technical market access information relating to frontier border inspection methods, market specific credence attributes and Maximum Residue Limits (MRLs) is not available in a condensed format accessible for Australian seafood exporters. Existing product integrity information is scattered across various industry reports, regulatory agencies and the published scientific literature. As a result, Australian seafood exporters often find introduction of their products into new and mature markets a difficult and at times costly process.

The existing SSA Project 2004/401 *A Market Access Guide for Seafood Exporters: International Residues Standards,* aims to address the lack of industry intelligence associated with market access requirements on a country specific basis and as such increase Australian seafood exports through compliance with importing countries jurisdictional and non-governmental requirements (e.g. traceability). Due to the changing nature of technical and non-technical barriers to trade issues the database will need to be expanded to adapt to a range of emerging market specific requirements such as traceability and emerging country-specific requirements such as for feeds and additives etc.

Objectives of the market access guide

- Inform Australian seafood exporters of varying market access requirements for residues and other technical requirements on a country specific basis.
- Provide a contemporary and easily accessible market access guide for seafood exporters.
- Compile country specific technical (MRL) and non-technical (credence attributes) information to assist Australian seafood exporters market access.
- Identify and review information relating to frontier border inspection.
- Reduce industry risk exposure to ambit claims for proof of product integrity status.

Technical Market Issues – Overview of Trade Issues

Data capture for the Market Access Guide Project (SSA 2004/401) is ad hoc; mostly acquired while on overseas trips funded by Industry for related purposes. The ongoing maintenance of the integrity of the information collected on behalf of industry is currently only funded until 2009 in the above SSA project 2004/401 at $3,500/annum. As the complexity of the technical barriers to trade have been discovered through overseas trips and industry networks the need to expand the existing project to meet these new needs has been realised. The beneficiaries have largely been the marine finfish sectors of the Australian aquaculture industry. These sectors have invested in the collection of this in-country market intelligence over several years.

Australian and New Zealand laboratory service providers with seafood analytical capacity have been summarised in Appendix 4, Table 4.3.

The main technical market issues that confront the Australian Seafood Industry are discussed below.

Laboratory Issues

Methods of analyses

1. There are differences in methods of laboratory analyses between countries: e.g. Limit of Reporting (LOR)/Limit of Detection (LODs), inclusion of breakdown metabolites (such as with DDT and the metabolites DDE and DDD etc).

Laboratory recognition

2. Some importing countries require the exporting country's national reference laboratory to be recognised by the importing county's Competent Authority: e.g. National accreditation schemes may not be recognised by the importing country's National Competent Authority.

Laboratory capability

3. Laboratory capability varies between countries: e.g. not all countries have national reference laboratories with appropriate internationally recognised testing capability to test for all residues and contaminants in imported products.

Food and by-products

4. Edible product vs. non-edible product: e.g. Testing of edible vs. non-edible product may differ (fish meal and fish oil).

Form of product

5. The form of the product that is exported (e.g. live product vs. frozen/fresh chilled product) may introduce different interpretation of national requirements: e.g. Different testing requirements may apply to products in different forms.

New compounds

6. Analytical capability for the measurement of new compounds is expanding internationally e.g. brominated flame retardants, mixed chloro bromo dioxins/PCBs (Japan), naphthalenes and the fluorinated compounds.

Access to appropriate microbiological controls and facilities

7. Microbiological testing is limited by availability of appropriately recognised control samples: e.g. some micro tests for certification of freedom of disease cannot be performed in Australia without access to control samples.
8. Access to Physical Containment facilities of appropriate security level for undertaking disease surveillance and diagnostics: e.g. The Australian Animal Health Laboratory at Geelong is the only Australian PC 4 level facility for handling aquatic diseases at present.

Marine health and bio-security

9. Different countries operate and interpret marine bio-toxin and freedom from disease requirements: e.g. EU requirement for freedom of notifiable disease is dependent on national programs.

Maximum Residue Limits (MRLs)

EU member nations' national MRLs

10. Some EU member nations have stricter national MRLs than those set across the European Community by the European Commission (EC): e.g. Germany and UK: Germany has additional MRLs for pesticides while the UK has limits set for crystal violet (dye).

Portion to which Maximum Residue Limit (MRL) applies

11. There are differences in portion to which the MRL applies between countries: e.g. Edible portion, skinless, whole, with bones or without etc. This may differ depending on the residue in question.

Technical basis of MRLs

12. The technical basis of the MRL may differ between countries: e.g. PCBs Aroclor technical mixtures of 1254/1260 (Australia), Kaneclor technical mixtures of 300, 400, 500 & 600 (Japan), European Union (EU) (Congener-based analysis).

Application of MRLs

13. There may be inconsistent application and preferential use of MRLs for domestic and imported products: e.g. Spain with cadmium in crustaceans.

Default MRL/MLs

14. Some countries have a default MRL/ML set (instead of a zero tolerance) for all agricultural and veterinary chemicals with no specific limit set: e.g. Japan (0.01 mg/kg), New Zealand (0.1 mg/kg) and the EU (0.01 mg/kg).

Aquaculture feed MRLs

15. Aquaculture feeds MRLs: e.g. the EU has aquaculture feed MRLs set. Australia is establishing a process to review possible source directed measures for stockfeeds including for aquaculture.

Feed additives

16. Ethoxyyquin and the butylated feed additives are used to prevent rancidity of fish oils and fish meals to produce a shelf stable aquaculture feed which does not require refrigeration. These compounds are under review in the EU at present due to human health concerns over their presence in aquaculture products. MRLs do exist for these compounds in the edible fishery products in some markets including Japan.

Multiplicity of standards

17. Multiple standards such as in China: e.g. Provincial level standards may conflict with national standards coupled with industry criteria.

Private house standards

18. Private house standards/local standards (importer standards):e.g. Importers/buyers may have additional standards which may overlap with quasi quality standards.

Transparency

19. Lack of transparency in importing country's standards: e.g. some countries do not have national standards such as the United Arab Emirates (UAE). Others may not make their national standards publicly accessible (e.g. the internet) but only available in hard copy format from a Government printing office.
20. Inconsistency in interpretation and application of MRLs: e.g. Ad hoc application of MRLs in mainland China.

Sampling Methods

Sampling methods at frontier border inspection stations

21. Each market has adopted its own frontier border inspection systems for conformance assessment with domestic standards. These systems may or may not be internally harmonised and may share aspects with major trading partners such as the EU. There are differences between sampling methods for determination of compliance with standards for residues and contaminants: e.g. in Japan, the Japanese Ministry of Agriculture Forestry and Fisheries (MAFF) use a cross-carcase composite sample formed from 10 individual fish for dioxins and PCBs, while the Japanese Ministry of Health, Labour and Welfare (MHLW) test edible filleted portions (o-toro, chu-toro and akami) for a range of agricultural and veterinary chemicals. The EU takes a centre cut from large fish for assessing compliance with EC standards.

Frontier border inspection stations

22. Frontier border inspection regimes at different ports in a country may not be consistent: e.g. Narita airport vs. Osaka or Fukuoka in Japan where certain laboratory tests for preservatives may or may not be undertaken on products such as canned abalone.

Compliance Issues

AQIS certification

23. Some countries require AQIS certification requirement for access to their domestic markets: e.g. some countries such as the EU and now the United Arab Emirates (UAE) require AQIS certification of compliance with Australian or importing county national standards. Participation in a residue surveillance program supervised by the national Competent Authority is now required for export of aquaculture products to the EU. SARDI negotiated a Deed of Agreement in early 2007 with the Australian Government Quarantine and Inspection Service (AQIS) to allow it to undertake sample collection activities, processing and analyses to fulfil formal EU market access requirements for the Australian aquaculture industry.

Absence of an internationally recognised national Competent Authority

24. Some countries do not have an identifiable national Competent Authority: e.g. the United Arab Emirates (UAE) does not have a national Competent Authority (responsibility is loosely administered through the Gulf Cooperating Countries network in Bahrain).

Compliance sample numbers

25. Variation in number of samples to determine compliance with MRLs/MLs: e.g. FSANZ require five samples to be taken to assess compliance with the mercury ML, while Codex recommends 12 samples be taken.

Taking of samples for compliance assessment purposes

26. In Australia there are two Competent Authorities for administration of food regulatory controls. FSANZ is responsible for national standards setting (enforcement activity is the responsibility of the State and Territories through domestic legislation) for food products sold within Australia. AQIS has jurisdiction over exported and imported food products. For compliance testing purposes FSANZ and AQIS have different sampling methodologies for interpreting compliance with the FSANZ Food Standards Code.

    AQIS takes samples for compliance testing purposes following the Australian Government Attorney General's Department *Imported Food Control Regulations 1993* under *Schedule 1 Selection of Samples (regulation 22)* http://scaletext.law.gov.au/html/pastereg/1/831/0/PR000440.htm

    The FSANZ ML for mercury is based on mean level of total mercury found. A minimum of five sample units must be taken to interpret test results against the

FSANZ ML For assessment with all other MRLs/MLs/ERLs or Generally Expected Level (GELs) there is no specific sampling requirements set by FSANZ.

Government Issues

Division of responsibilities within overseas Governments

27. There may be multiple Government agencies with inspection/testing responsibilities for imported seafood (Japan):e.g. MAFF – dioxins, PCBs. MHLW – agricultural and veterinary chemicals, metals. The Competent Authority may have mixed jurisdiction over the food supply chain.

Availability of violation reports

28. Public reporting of import violations practice varies from country to country e.g. some countries report directly to the exporting country (EU) while others report in the public media or not at all.

Equivalence requirements

29. Some countries, such as the EU, Canada and the US, require importing countries to be on an approved importers list and have an equivalent shellfish sanitation program in place as the market destination country.

Traceability

30. Traceability requirements have now emerged in several key markets for seafood products. These include the EU, US and Australia (Japan has announced voluntary standards for farmed bluefin tunas).

In summary there is a range of technical market access issues that may restrict or impede entry of Australian seafood products into overseas markets. Some of these are being addressed through international forums such as Codex. Other countries such as New Zealand have initiated bilateral agreements with key markets such as the EU to remove many of these non-tariff technical market access barriers; a much more expedient process.

Laboratory Conformance Assessment

Documentary standards are published by organisations such as the International Organization for Standardization (ISO). Laboratories and organisations throughout the world have developed ‘best practices’ for the analyses of residues, contaminants and natural toxins in seafood over many years. Through a long standing process of consultation and consensus, many of these practices have been documented as international standards which define performance benchmarks for provision of these services.

Accreditation issues

For seafood products being exported, laboratory analyses must be carried out in organisations that are accredited by the national accreditation authority. This is also true of goods being imported into Australia. As a result, most WTO member signatories have developed similar conformity assessment structures to meet their domestic needs and facilitate trade. Mutual

Recognition Arrangements have been established between accreditation authorities enabling reports from foreign accredited bodies to be accepted as being within their own regulatory requirements. International accreditation bodies have established international and regional bodies for cooperation, information exchange and harmonisation of procedures. They have also established Mutual Recognition Arrangements for each others systems.

The scope of laboratory accreditation is generally poorly defined by accreditation providers e.g. terminology used such as biota, meat products, animal products, seafood, fish, agricultural materials, muscle tissue, fat tissue and biological materials.

Governments are using accreditation to develop and enhance trade agreements. The use of Mutual Recognition Arrangements builds confidence between governments and accreditation bodies and facilitates the acceptance of testing, calibration and inspection reports between countries. This helps reduce technical barriers to trade with those countries which recognise these accreditation arrangements. In the domestic marketplace, accreditation of the laboratory service provider may assist in developing credibility and brand recognition.

Accreditation scope considers a range of factors

Accreditation covers a range of factors including:

- Competence and experience of staff
- Integrity and traceability of equipment and materials
- Technical validity of methods
- Validity and suitability of results and
- Compliance with appropriate management systems standards and
- Competent to carry out services in a professional, reliable and efficient manner.

Australian and New Zealand accreditation providers

Australian accreditation is provided by the National Association of Testing Authorities (NATA), an industry body of technical experts. In New Zealand, International Accreditation New Zealand (IANZ) is the accreditation provider; it is responsible to the New Zealand Parliament as a New Zealand Government Statutory Authority. Both are mutually recognised by each other. Both provide assurance of the laboratory's technical competence to undertake analysis for specific compounds in defined matrices.

It should be noted there is no seafood representation on the NATA board. In New Zealand IANZ includes representatives from the food industry in its organisational structure.

International recognition of laboratories by importing countries' Competent Authorities

Some countries such as Japan require exporting countries' laboratories performing market access testing for seafood products to be accredited by the Japanese Competent Authority (Japanese Ministry of Health, Labour and Welfare). This is in addition to any requirements set by the domestic Competent Authority.

Other certification may be required, such as from the European Commission through the Food and Veterinary Office (FVO) for EU bound exports.

AQIS recognition of laboratories

AQIS publishes a list of laboratories it recognises as competent to perform official testing services for product to be export certified by AQIS and for imported products. It should be noted that importers may choose any laboratory on this list to undertake testing.
http://www.daff.gov.au/_media/documents/aqis/importing/food/testing-labs/analyst_testing.pdf

Joint Accreditation System of Australia and New Zealand (JAS-ANZ)

JAS-ANZ is the government-appointed accreditation body for Australia and New Zealand responsible for providing accreditation of conformity assessment bodies in the fields of certification and inspection. Accreditation by JAS-ANZ demonstrates the competence and independence of these bodies. JAS-ANZ oversees the activities of NATA and IANZ. http://www.jas-anz.com.au

Deed of Agreement between SARDI and AQIS

Both SARDI and the National Residue Survey (NRS) provide market access residue testing services to fulfil EU market access requirements. SARDI negotiated a Deed of Agreement in early 2007 with AQIS to allow it to undertake sample collection activities, processing and analyses for the Australian aquaculture industry to fulfil formal EU market access requirements.

Laboratory Capability Gaps

In general there is good coverage by Australian and New Zealand laboratory service providers for traditional residues and contaminants e.g. metals. However, there is poor coverage for veterinary therapeutics including steroids, stilbenes, anthelmintics and antibiotics. These are summarised in Appendix 4, Table 4.3.

1. All laboratories included in this review have ISO 17025 certification for laboratory quality management systems.
2. Only one laboratory has market place recognition from key international markets including the US, Japan and the EU.
3. Proficiency testing arrangements could only be established for one laboratory service provider. Proficiency testing adds to rigour of test results through independent verification of in-house methods and procedures.
4. The matrices covered by the terms of accreditation varied widely with terms such as biota, seafood, fish, meat products, prawns, meat fat, biological tissues, crustaceans and agricultural materials. Inconsistency in application of the scope of accreditation differs not just between laboratories but also between accreditation providers (NATA/IANZ).
5. The scope of accreditation for the compounds covered differed from laboratory to laboratory and from accreditation provider to provider. The use of generic descriptions such as organochlorine pesticides vs. individual named pesticide compounds can be seen in a number of cases. This approach may provide operational flexibility to the laboratories but does not identify specific capability in laboratories for individual compounds.

6. It is not possible to assess analytical methodology equivalence issues. There would appear to be a general lack of participation in proficiency programs.
7. In New Zealand, the New Zealand Food Safety Authority (NZFSA) National Residue Survey (NRS) program itself (including sampling & analysis of samples) is covered by the scope of accreditation issued by IANZ.

Terms of Reference 2: Research and Development

Identify and detail research and development work being undertaken in key markets in relation to food safety and product integrity that may impact on Australian seafood exporters.

A listing of research being undertaken in key Australian seafood markets is provided in Appendix 2, Table 2.1. This table summarises key contacts within international regulatory agencies and research institutions in key markets.

Carbon footprint

The European Initiative for Sustainable Development in Agriculture began in 2001 and is now active in France, Germany, Italy, Luxembourg, Sweden, the United Kingdom, Austria and Hungary (www.sustainable-agriculture.org). The program takes into account social and environmental sustainability including water, human and social capital, energy usage, animal welfare, biodiversity and waste management in the production of foods. This work has the potential to disadvantage Australian exporters due to the shipping distance to food markets in the EU. On the other hand, it may help to differentiate Australian product in the EU market through other environmental and social criteria such as the use of renewable energy and sustainable fishing practices etc. The use of eco-friendly biodegradable packaging will also help to reduce carbon score. This provides Australian exporters with multiple options they can use to reduce their carbon score throughout the production and supply chain.

Tesco supermarkets in Europe will begin labelling seafood product with a carbon score from 2012, this is a mandatory program for suppliers (http://www.tesco.com/climatechange/). There will be challenges for Australian exporters to develop the necessary record keeping systems to validate these purchasing criteria.

Traceability

The development of real time traceability systems will allow verification of end point needs such as carbon footprint scores and differentiation of product in the EU market with competitor products. The EU defines traceability in Directive 178/2002 as "…the ability to trace and follow a food, feed, food-producing animal or substance intended to be, or expected to be incorporated into a food or feed, through all stages of production, processing and distribution."

Research Capabilities in Key Markets

The research areas covered in Appendix 2 are of major interest to Australian seafood exporters. These include research providers in New Zealand (some of these are also service delivery agents for regulatory control programs in some countries). The main capabilities of these research providers can be summarised into broad groupings including:

- Residues and contaminants
- Marine bio-toxins
- Marine microbiological hazards
- Predictive modelling
- Analytical methods development
- MRL development

- Frontier border inspection methods
- Sampling methods for compliance inspection.

The analytical capability of research institutes in Japan and Hong Kong far exceeds that available in Australia. Governments, such as Japan, sponsor study and overseas field placements for their scientists within international Competent Authority national reference laboratories to develop analytical techniques e.g. brominated flame retardants in fish.

Frontier border inspection testing may be undertaken in research institution laboratories on a delegated basis from the Competent Authority. The development of analytical methodologies, setting of MRLs and advice to the Competent Authority often originates in research institutions (e.g. Chinese Ministry of Agriculture standard for *tunas for raw consumption*).

The Danish traceability program Seafoodplus is an example of where a single EU member nation has undertaken to establish and validate traceability systems on behalf of all of the European Community.

Australia and New Zealand both rely on the technical capability of one New Zealand biotoxin reference laboratory to fulfil market access testing requirements. However, New Zealand has negotiated a bilateral agreement with the EU which advantages New Zealand seafood exporters, but not Australian seafood exporters. This agreement with the EU simplifies the compliance testing and costs for New Zealand seafood exporters accessing the EU market.

Many research activities are conducted for commercial companies on a confidential basis. These activities are not included in the summaries provided in this review.

Terms of Reference 3: Seafood Safety and Product Integrity

Identify and detail work being done, or being proposed, internationally by industry or governments in relation to seafood safety and product integrity.

International seafood safety and product integrity activities have been summarised by country in Appendix 2, Table 2.1. The most active countries are also key markets for Australian seafood.

See Terms of Reference 2 for key observations on international activities. The key observation is that Australia is probably the only country where research service providers can work with aquaculture sectors on a through-chain basis to identify hazard pathways and risk management options.

Terms of Reference 4: Codex and other International Activities

Investigate and detail current Codex and other international activities that may influence the technical requirements of Australia's key market

Codex Alimentarius is the key international food standards body for product in trade between countries. It is composed of members of the United Nations (UN) and the World Health Organisation (WHO) with its head office in Rome, Italy.

Current Codex activities in relation to Fish and Fish Products

Codex Australia is responsible for formulating Australia's national position on Codex Committee issues. A number of issues that affect the seafood industry are currently before a variety of Codex committees at present. Some of these are microbiological while others are chemical technical market access concerns. These are summarised below.

Codex committees summary

The following Codex Committees cover market access issues that may affect seafood products in international trade.

1. Codex Committee on Fish and Fish Products (CCFFP)
2. Codex Committee on Residues of Veterinary Drugs in Foods (CCRVDF)
3. Codex Committee on Contaminants in Foods (CCCF)
4. Codex Committee on Pesticide Residues (CCPR)
5. Codex Committee on Methods of Analysis and Sampling (CCMAS)
6. Codex Committee on Food Hygiene (CCFH)
7. Codex Committee on Food Import and Export Inspection and Certification Systems (CCFIEICS)
8. Codex Committee on Food Additives (CCFA)

- Guidelines for hygienic control of *Vibrio Spp*. in seafood (prepared by the United States).
- Hygiene provisions in the Draft Standard for live and raw bivalve molluscs is disputed by members of the Codex Hygiene Committee (biotoxins have been referred on to Codex Committee on Contaminants in Foods) – CCFFP.
- Development of guidelines to control norovirus in bivalve molluscan shellfish (prepared by The Netherlands).
- Retention of the MRL for Flumequine in muscle for shrimps.
- Proposed MRLs for the veterinary drugs Erythromycin and Triclabendazole.
- Microbiological criteria on *Listeria monocytogenes* in Ready-to-Eat Foods.
- Draft Maximum Level for Lead in Fish.
- Draft Maximum Level (ML) for cadmium in marine bivalve molluscs (excluding oysters and scallops) and in cephalopods (without viscera).
- Proposed draft Code of Practice for the prevention and reduction of dioxin and dioxin-like PCB contamination in foods and feeds (including aquaculture).
- Code of Practice for the reduction of contamination of food with PAH from smoking and direct drying processes.
- FAO/WHO expert consultation on the health risks associated with methylmercury and dioxins and dioxin-like PCBs in fish and the health benefits of fish consumption.

- Postponement on consideration of need to revise guideline levels for methylmercury in fish pending the outcomes of a requested FAO/WHO Expert Consultation.
- Retention of the current Codex guideline levels for methylmercury in fish.
- Not proceeding with the development of a list of predatory fish and not to start compiling data on the ratio of methylmercury to total mercury in different fish species and to possibly consider this at a later stage with a particular focus on the different ratios for shellfish.

Codex measures on animal feeds

- Codex code of practice on good animal feeding

The Australian delegation is led by DAFF staff in Canberra with invitation offered to Australian experts on technical matters of each Codex Committee to attend. Generally safety and hygiene issues are referred by Codex Committee on Fish and Fish Products to Codex Committee Food Hygiene for evaluation and comment through the Codex process.

Codex trade dispute resolution

The Codex Alimentarius (Food Code) was established in 1963 when the Food and Agriculture Organisation of the United Nations (FAO) and the World Health Organisation (WHO) recognised the need for international standards to guide the world's growing food industry, protect the health of consumers and promote fair practices in food trade. Since that time the Codex Alimentarius Commission (CAC) has produced food commodity standards, hygienic and technological practice codes and maximum residue limits for pesticides and veterinary chemicals to help meet these needs.

Codex standards gained greater importance following the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS) and the Agreement on Technical Barriers to Trade (TBT). Both encourage the international harmonisation of food standards. The SPS Agreement Cites Codex standards, guidelines and recommendations as the preferred international measures for facilitating food trade. As such, Codex standards are the benchmarks used in cases of trade disputes before the World Trade Organisation (WTO).

The outputs of the CAC are achieved through the work of general subject committees such as CCMAS, commodity committees, regional co-ordinating committees and ad hoc inter-government task forces.

Codex standards are established according to the key principle that they must be based on the best science available at the time and that all processes must be rigorous and transparent. In many instances, the best science available relies on good analyses performed by competent laboratories employing proven, reliable test methods.

Terms of Reference 5: Trends in Rejections

Identify trends in rejections of Australian seafood shipments and reasons for them.

A summary of international seafood detention reports of Australian seafood exports is provided in Appendix 3, Table 3.1. This data was obtained from a variety of public sources published by overseas authorities (footnote Table 3.1). Whilst it is the practice of the EU, Japan, China, Canada and the US to publicly disclose detentions of imported product there is likely to be additional information held by AQIS on the specific facts related to each rejection. This information is not publicly available due to the Privacy Act of 1988.

The major findings are that of the 41 detentions:

- There were 37 detentions for cadmium (prawns, crabs and squid). Two of these detentions occurred in China. AQIS has not been able to verify the authenticity of one of these detentions with the Chinese authority (General Administration of Quality Supervision Inspection and Quarantine).
- There were two detentions for polyphosphate additives in prawns by an EU member state. These were subsequently challenged by AQIS through the Hellenic authorities in Athens and were retracted.
- There was one detention for the presence of parasites (unspecified) by an EU member state.
- There was one detention for poison in swordfish (from QLD) by the US.

Australian Wild-Capture Prawns Cadmium Violations

In relation to cadmium, the majority of these were from EU member nations (predominantly Spain but also included Italy, Portugal and Greece). There have been two detentions in China for cadmium in prawns, squid and crabs. One of these Chinese reports is believed to be spurious. Product entered these markets by a variety of methods including ship and or truck through neighbouring EU member nations.

With regard to prawns, the violations include a broad range of wild-capture Northern Australian species. Thirty of the 37 detentions were in the months July to December, with 17 occurring between July and September and a further 13 occurring between October and December. In the disclosed reports the volume of product and the port of entry is not provided, however, it is presumed that the bulk of product is entering the EU pre-Christmas and the European summer period.

The ML (that applies across all EU member nations) that was exceeded is 0.5 mg/kg. Australia does not have a national ML for cadmium in crustaceans (Australia formerly had an ML of 2 mg/kg which was abolished as there was no control mechanism). The portion tested is not disclosed in the public detention report summaries. However, this information will have been made available to the exporting country's Controlling Authority (AQIS). In two cases the levels of cadmium found are publicly disclosed (0.76 and 0.71 mg/kg).

From the publicly disclosed reports we were not able to determine if aquaculture prawns were involved in any of these detentions. Scott Walter of the Australian Prawn Farmers Association (APFA) has confirmed that no Australian aquaculture prawns have been detained for cadmium violations in any market (pers. comm.).

US squid cadmium violations into the Spanish market

US squid exports to Spain were marred for several years by detentions in the late 1990s for cadmium. At the WTO Spain acknowledged that it did not apply the EU ML for cadmium to domestic product or product from other EU member nations. Spain chose to discontinue testing of US squid imports. With respect to Spanish domestic caught prawns no testing is undertaken for cadmium (World Trade Organisation, Committee on Sanitary and Phytosanitary Measures, 14th November 1996, G/SPS/R/6).

Neither Codex nor Australia has an ML set for cadmium in crustacea. Codex's view is that the contribution of seafood to the total cadmium exposure is minimal and consequently has no process underway to establish an ML. A European Commission (EC) report confirms the low exposure in EU member nations from the crustacea product category (SCOOP 3.2.11 – Assessment of the dietary exposure to arsenic, cadmium, lead and mercury of the population of the EU Member States, Directorate-General Health and Consumer Protection, March 2004).

How does Australia fare when compared internationally?

The situation in relation to other countries is summarised in the FAO report *Causes of Detentions and Rejections in International Fish Trade*, FAO Fisheries Technical Paper 473. These detentions are summarised into three categories in the text box below.

Causes of detentions in international fish trade

The overall consolidated causes of detentions in international fish trade can be broken down into three descriptive groups.

- Microbiological – 47%
- Chemical – 47%
- Other causes – 6%

Microbial causes were related to a number of organisms including *Vibrio spp*., *Salmonella*, *Enterobacteria*, Total Plate Counts, parasites, *Staphylococcus*, *E. coli* and other organisms.

Chemical causes included veterinary drug residues, heavy metals, chemical contamination, pesticide residues and mycotoxins.

Other causes related to certificate problems, sensory, species identification, temperature problems, use not allowed, packaging damaged, moisture and vermin.

Opportunities for Collaboration

Terms of Reference 6: Research and Development

Determine what research and development capabilities exist and the opportunities for collaboration within Australia.

National research and development provider capabilities are summarised in Appendix 4, Table 4.1. In a large part this listing was derived from indicative projects provided during the Australian Seafood CRC bid process in January 2006.

The information provided does not take into account the quality and proficiency of the various research providers. The capacity is widely dispersed and requires the resources provided by a CRC to draw together related groups to deliver on major industry issues.

Opportunities for collaboration have already been identified in approved projects (e.g. oyster quality and safety) and indicative project submissions.

There is a major opportunity for linking projects within the CRC that might be done on benchmarking residues with potential consumer exposure and risk:benefit evaluations.

Completed and ongoing research projects by Australian and New Zealand research providers are summarised in Appendix 4, Table 4.2. This table was prepared based on information provided by the Aquafin CRC, FRDC, SSA and the new Australian Seafood CRC in the public domain and internally held information sources. The list is inclusive of those projects funded by the Australian Government through these funding agencies. Additional information was obtained with the assistance of Dr Peter Montague (Aquafin CRC) and Mr Justin Fromm (FRDC) on individual project listings not available in the public domain.

The level of rigour of data to inform regulatory risk assessments to support market access negotiations has not been established for the projects listed in Appendix 4, Table 4.2. There is an opportunity to use research data for market access purposes as long as market specific criteria are met (see Terms of Reference 1); e.g. Aquafin CRC Projects 2004/206 *Aquafin CRC - SBT Aquaculture Subprogram: Management of Food Safety Hazards in Farmed Southern Bluefin Tuna to Exploit Market Opportunities* and *Aquafin CRC- Southern Bluefin Tuna Aquaculture Subprogram: Development and Validation of Baitfish Sampling Methods to Address International Residue Standards for Southern Bluefin Tuna* (*Thunnus maccoyii*).

Laboratory conformity assessment is an important part of evaluating quality of data for informing regulatory decision making. The box below highlights some of the key considerations that should be covered when selecting a selecting a laboratory or evaluating data produced.

An evaluation of the opportunity provided by the WA Chemistry Centre has also been undertaken based on publicly accessible material. The technical criteria against which their services may be evaluated are provided in the text box below.

Criteria to evaluate research capability of commercial analytical laboratories

The following criteria reflect the key considerations when selecting laboratories to conduct research where the data may be used for trade purposes (i.e. meeting existing market access requirements, submissions for variations to MLs/MRLs, equivalence & harmonisation). It is noted that these criteria also apply to Terms of Reference 1 & 3 of Kevin Shiell's contract to evaluate the usefulness of laboratory capabilities surveyed by the NRS with respect to underpinning seafood exports.

These criteria are summarised below:

- Does the lab hold national or international accreditation for reporting results (NATA/IANZ) for market access purposes?
- Does the terms of accreditation cover requirements of key markets e.g. type of sample, matrix tested, LOR/LOD, methods etc?
- Is the lab recognised by key markets' National Competent Authorities?
- What is the lab capability/throughput/experience e.g. cadmium in crustaceans?
- Is the lab familiar with various market requirements e.g. portion tested, method of analysis, metabolite compounds, methods of reporting etc?
- Does the lab participate in national and international proficiency testing programs?
- Does the lab have a history of serving National Residue Survey (NRS) programs?

The criteria listed above apply equally to chemical and microbiological hazards present in seafood.

WA Chemistry Centre

The WA Chemistry Centre is the oldest continuously NATA accredited laboratory facility in Australia. Its function and core business is across multiple strategic areas including food and agricultural products chemistry, forensic sciences and racing chemistry. In August 2007 the WA Chemistry Centre was made into a statutory authority responsible to a seven member board chaired by BHP Billiton executive officer Brett Mattes.

The WA Chemistry Centre will relocate to purpose built facilities on a shared university campus site in Perth in 2009. This will see the consolidation of WA police forensic services with the services of the WA Chemistry Centre onto a single site.

Research capability

The research capability of the WA Chemistry Centre is varied and has been developed largely in response to forensic science needs in WA. The emergence of non-tariff trade barriers to agricultural exports is a new area being developed within the WA Chemistry Centre. Analytical capability is often not accredited for particular seafood matrices at present. Particular analytical capability is summarised below.

Laboratory set up and design

The WA Chemsitry Centre is set up with model systems in place for receival of specimens.

Each division within the centre has its own sample receival area so there is no mixing of sample types such as food with mineral specimens. The sample receival areas are all key coded access pass controlled. Sample processing equipment cannot be moved from one part of the laboratory; thereby protecting sample integrity. The sample receival and processing area is under video surveillance. Samples arrive in sealed refrigerated shipping boxes with a key kept only by the laboratory chain of custody supervisor and the despatch agency. All samples boxes or locked satchels are sealed with evidence tape which changes colour if there is any tampering to the seal. Each sample is uniquely bar coded. Each time the sample is moved or a task performed on it an electronic record is kept of its movement and chain of custody.

Staff access is restricted within the building to designated areas only. Log in books are set up in areas of the lab for staff members to sign in if they are entering an area they do not have security clearance to enter.

Sample reagents and standards are not kept in the sample receival or sample processing areas of the laboratory. Physical separation of these areas helps prevent cross-contamination.

The whole laboratory precinct is an AQIS approved place of quarantine.

Trade capability and accreditation recognition by international markets
The WA Chemistry Centre as a WA Government Statutory Authority has regulatory control functions such as for testing of imported fertilizers before terrestrial agricultural application is allowed in WA.

- Laboratory competency recognised by the Japanese Ministry of Health, Labour and Welfare http://www.mhlw.go.jp/topics/yunyu/5/dl/a9.pdf.
- Obtaining AQIS laboratory listing as approved premises for testing imported foods.
- Not currently EU listed (considering obtaining EU listing).
- Obtaining NATA accreditation for non-listed non-routine types of analyses. NATA accredited for other tests such as metals and pesticides at present.
- Partnership with PathWest www.pathcentre.com.au for provision of food microbiology.
- APVMA registration as a veterinary drug manufacturing facility.
- Staff are all trained as expert witnesses for legal prosecution court cases.

Accredited laboratory testing capability
NATA accreditation has been obtained for the tests listed below. That is for these tests the centre has validated methods for seafood matrices. The centre is recognised by the Japanese Ministry of Health, Labour and Welfare for its technical competence as a laboratory.

Pesticides
Traditional pesticide analyses have been performed around those compounds registered for use in Australia (or previously registered). The introduction of the Japanese *Positive List System* saw more than 800 new agricultural and veterinary chemicals, mostly unknown in Australia, appear in border inspection testing in 2006 for imported foods.

- Pesticides and crop protection chemicals.

Metals
Metals capability in traditional matrices such as fish has been undertaken for many decades in Australia.

- Metals (total and speciation)
- Isotopic speciation of metals
- Cadmium chemistry in crustaceans
- Fertilizers for heavy metal content.

Non-accredited laboratory testing capability
The centre also currently has laboratory capability for measurement of many other trade sensitive residues and contaminants but does not currently have NATA accreditation to report these tests in seafood matrices. The centre is still recognised by the Japanese Ministry of Health, Labour and Welfare as being technical competent.

Organometallics
Some countries such as the US base their import standard for mercury on methylmercury not total mercury. Australia has set its arsenic standard based on inorganic arsenic in seafood. The tributyl tin compounds are widely used as marine antifoulant coatings for ships.

- Methylmercury
- Inorganic arsenic
- Alkyl tins (antifoulants).

Banned veterinary drugs
In Australia there is no registration and no FSANZ MRL set for a range of veterinary drugs including growth steroids, dyes and other drugs in food producing aquatic animals.

- Steroids
- Illicit veterinary therapeutics e.g. chloramphenicol etc
- Dyes (malachite green and crystal violet).

Nutritional testing
The WA Chemistry Centre undertakes regulatory control programs for WA Government Agencies for assessment of retail products with FSANZ nutritional labelling requirements.

- Nutritional chemistry for labelling purposes of seafood products
- Sulphites (preservatives)
- Ethoxyquin (feed preservative)
- Phenolic antioxidants including Butylated hydroxytoluene (BHT) and Butylated hydroxyanisole (BHA)
- Tocopherols (vitamin E) and ascorbic acid (vitamin C) – natural preservatives.

Non-routine chemistry
The WA Chemistry Centre is currently obtaining NATA accreditation for analyses of non-routine matrices for non-routine compounds. This recognises the general technical competencies of the staff and the analytical problem solving skills across the WA Chemistry Centre. As an example the centre was analysing sea turtle eggs for PCBs (Aroclors) for an indigenous dietary survey during my visit.

- Animal stockfeed
- Toxic alkaloids in grains (for inclusion in feeds)
- Sediment geo-chemistry

- Veterinary drug manufacture for emergency response
- Human pharmaceutical clinical trial evaluations in blood
- GM detection in feeds
- Land Animal Protein detection in feeds.

Forensic Sciences
The key capabilities of the WA Chemistry Centre are maintained largely through the forensic science division of the centre.

- Heavy mineral analyses for identification of catch site
- Chemical spoilage indicators using volatile organic sensors
- Taint investigation of seafood
- Mobile analytical instrumentation
- Electron microscopy direct elemental analyses
- DNA database of fish species (fish substitution)
- Isotopic speciation for identification of catch site of seafood
- Emergency response capability for oil spills at sea etc
- Traceability (nucleus DNA signature for high value seafood e.g. abalone).

Limitations of WA Chemistry Centre for fulfilling trade requirements
The WA Chemistry Centre currently has no contract work in place with the NRS. However, the NRS frequently seeks verbal advice from staff at the centre on particular compounds and methods of analysis. The centre is relocating to new premises which will enable higher level accreditation to be sought such as from the EU and or the US DA.

- Seeking accreditation for seafood matrices and individual compounds not currently covered by NATA accreditation.
- Dioxins and PCBs by congener-based methods currently not available.
- EU accreditation for AQIS export testing.
- Marine Biotoxins – able to analyses domoic acid for WA Health Department program.
- Geographic distance from seafood industry sectors. Potential courier difficulties with overnight delivery of samples to Perth.
- Marine microbiology not available on site (partnership with PathWest in Perth).

Australian Food Safety Centre of Excellence

The University of Tasmania has an international reputation for leadership in the area of modelling of the microbial ecology of foods, a discipline that has been termed 'predictive microbiology'. Products of this research, primarily in the form or predictive tools and risk assessment, have been used by various businesses to enhance access of their products in domestic and international markets.

Examples include the Refrigeration Index (RI) and *E. coli* Inactivation Model funded by Meat and Livestock Australia Ltd (MLA). The RI underpins food safety management practices for beef products that have high access to USA markets, and resulted in The Australian Quarantine Inspection Service (AQIS) revising the Export Control (Meat and Meat Products) Orders in AQIS Meat Notice: 2001/19 - Assessment of deterioration of refrigerated meat affected by refrigeration breakdown, incidents and accidents to require that the RI be used to ensure the safety of chilled meat products (AQIS, 2005). As a result, these tools have been independently assessed to return a net industry benefit of $44 million. The industry benefit-cost ratio from predictive microbiology is 11:1. $260 million of additional social benefits are projected over 30 years.

The *E. coli* Inactivation Model has supported the development of domestic markets for fermented meat products because it was developed in conjunction with industry and Food Standards Australia New Zealand. MLA funded the UTas group to provide a review and analysis of relevant published literature and unpublished data to identify key process parameters affecting inactivation of *E. coli* during fermentation and maturation of fermented meat products. The analysis of available data combined with data from earlier strategic-basic research by the group provided new insights enabling the development of a predictive model, the utility of which was endorsed by FSANZ and other regulatory bodies, and accepted for use as a tool to judge process safety.

The group's modelling expertise has been applied in other projects related to market access, including the Pork-to-Singapore project, as well as the integration of models with traceability technologies.

Group members are involved in activities at a national and international level that influence the development of policy for market access. Members of the group have contributed on >6 occasions since 2001 to expert consultations on microbial food safety conducted by the World Health Organization (WHO) and Food and Agriculture Organizations (FAO) of the United Nations in support of Codex Alimentarius Commission imperatives.

Terms of Reference 7: Opportunities for International Collaboration

Identify potential opportunities for collaboration internationally.

A summary of completed and in progress projects (including research provider details) is presented in Appendix 2, Table 2.1. This provides an informed background for development of potential linkages with international research providers. This listing has been prepared based on personal visits to each of these research centres by David Padula.

Some of these researchers are involved in Australian based research projects such as Kinki University (Japan) and the Stehr Group on Bluefin Tuna propagation.

Appendix 1

Table 1.1 Summary of exported Australian aquaculture and wild capture seafood by market destination country for the period 2005-2006 (does not include live product sales)

Country	Quantity (T)	Value (AUD$)	Price per kg (AUD$)
Hong Kong	9,314	396,011,000	42.52
Salmon, whiting, dried salted or smoked fish, rock lobster, prawns, crabs, abalone, scallops			
Japan	17,874	370,509,000	20.73
Tuna, salmon, whiting, prawns, rock lobster, dried salted or smoked fish, crabs, abalone, scallops			
United States	3,117	112,838,000	36.20
Tuna, salmon, canned fish, rock lobster, prawns, crabs, abalone, scallops			
China	4,799	102,374,000	21.33
Rock lobster, prawns, crabs, abalone, whiting			
Taiwan	2,092	55,217,000	26.39
Rock lobster, prawns, crabs, abalone, scallops, finfish			
Singapore	1,058	36,283,000	34.29
Salmon, whiting, dried salted or smoked fish, canned fish, rock lobster, prawns, crabs, abalone, scallops, other molluscs, other molluscs			
France	714	20,904,000	29.28
Tuna, rock lobster, scallops			
Spain	1,434	18,985,000	13.24
Prawns			
Other (Samoa, Korea, United Arab Emirates, Egypt, Fiji, Mauritius & Germany)	4,267	18,797,000	4.41
Tuna, salmon, whiting, rock lobster, prawns			
New Zealand	2,191	11,664,000	5.32
Salmon, prawns			
Vietnam	986	9,438,000	9.57
Tuna, prawns			
Thailand	2,110	8,466,000	4.01
Tuna, whiting, salmon			
Italy	454	8,113,000	17.87
Prawns			
Greece	433	7,563,000	17.47
Prawns, rock lobster			
Malaysia	387	5,928,000	15.32

Country	Quantity (T)	Value (AUD$)	Price per kg (AUD$)
Prawns, scallops, rock lobster, other molluscs			
Portugal	416	5,165,000	12.42
Prawns			
United Kingdom	137	3,431,000	25.04
Rock lobster			
Canada	109	3,333,000	30.58
Abalone, other molluscs			
Indonesia	410	2,245,000	5.48
Salmon			
GRAND TOTALS	**52,302**	**1,197,264,000**	

Live seafood trade sales (not included above) were worth $40,078,000 in 2005-2006

Source: http://www.abare.gov.au/publications_html/fisheries/fisheries_07/07_fishstats.pdf

Table 1.2 Summary of national edible aquaculture production for the period 2005-2006

Seafood type	Quantity (T)	Gross Value (AUD $)	Price per kg (AUD$)
Fish			
Silver perch	361	3,280,000	9.09
Eels, Yellowtail Kingfish, Mulloway & other native fish	397	7,353,000	18.52
Trout	1,955	10,813,000	5.53
Barramundi	2,075	17,167,000	8.27
Tuna	8,806	155,795,000	17.69
Salmon	19,219	221,013,000	11.50
Totals	**32,813**	**415,421,000**	
Crustaceans			
Redclaw	103	1,272,000	12.35
Yabbies	93	1,338,000	14.39
Marron	66	1,687,000	25.56
Prawns	3,541	49,887,000	14.09
Totals	**3,803**	**54,183,000**	
Molluscs			
Mussels	3,223	8,916,000	2.77
Abalone, scallops & giant clams	532	19,765,000	37.15
Oysters	11,995	83,863,000	6.99
Other aquaculture*	**15,750**	**156,712,000**	9.95
Other aquaculture not listed elsewhere due to confidentiality restrictions			
Totals	**1,710**	**44,168,000**	
GRAND TOTALS	**54,076**	**626,316,000**	

*Note: 25% of aquaculture production is listed as ‘other’ due to industry confidentiality restrictions on data publication. This category does not include pearls from oysters (this non-edible category has been removed along with aquarium fish).

Source: http://www.abare.gov.au/publications_html/fisheries/fisheries_07/07_fishstats.pdf

Table 1.3 Summary of edible wild caught seafood for the period 2005-2006

Seafood type	Quantity caught (T)	Gross Value (AUD$)	Price per kg (AUD$)
Fish			
Gemfish	547	1,836,000	3.36
Dories	996	3,476,000	3.49
Australian salmon	4,191	3,647,000	0.87
Bream	1,046	5,499,000	5.26
Orange Roughy	2,381	6,370,000	2.68
Ling	1,352	7,016,000	5.19
Spanish Mackerel	1,440	9,188,000	6.38
Barramundi	1,388	10,657,000	7.68
Mullet	4,902	10,748,000	2.19
Flathead	5,040	16,433,000	3.26
Whiting	4,372	17,332,000	3.96
Australian sardine	33,539	27,567,000	0.82
Sharks	8,752	30,666,000	3.50
Coral Trout	1,190	34,870,000	29.30
Tuna	9,085	56,273,000	6.19
Other	51,308	151,821,000	2.96
Totals	131,532	393,400,000	
Crustaceans			
Other	285	3,185,000	11.18
Crabs	5,340	41,205,000	7.72
Prawns	19,646	252,128,000	12.83
Rock Lobster	16,170	470,366,000	29.09
Totals	41,441	766,884,000	
Molluscs			
Octopus	445	2,615,000	5.88
Pipis	1,731	4,246,000	2.45
Squid	2,705	7,993,000	2.95
Other	462	14,356,000	31.07
Scallops	8,690	24,981,000	2.87
Abalone	4,979	206,015,000	41.38
Totals	**190,11**	**260,206,000**	
GRAND TOTALS	**191,984**	**1,420,489,000**	

Source: http://www.abare.gov.au/publications_html/fisheries/fisheries_07/07_fishstats.pdf

Table 1.4 Residue Management Models in Key Overseas Markets: SWOT Analysis

Model	Strengths	Weaknesses	Trade Opportunities	Trade Threats
Australia • National MLs/MRLs • Zero tolerance if no MRL • Standards available on the web	• Based on scientific exposure assessments (ADI's etc) • Transparent • Consistent • Codex compliant	• Zero tolerance when no MRL set • Can create trade problems with low level residues • Adoption by States and Territories has been inconsistent	• Restricts entry of imports from elsewhere • AQIS flexibility to test imported product	• Test sensitivity is increasing, while analytical capacity is rapidly increasing overseas but not domestically • Increased surveillance of products imported into Australia could be applied to Australian products in overseas markets
Taiwan • National MRLs • Standards available on the web	• Transparent	• Technical basis of MRLs not always clear e.g. PCBs as Aroclors	• Quantity rather than quality • Festival based consumption	• Relationship with neighbouring countries • Most food is imported from China • WTO member under Customs Territory of Taiwan, Penghu, Kinmen and Matsu (Chinese Taipei)
Singapore • National MRLs • Banned substances • Standards not available electronically on web	• Transparent	• Zero tolerance approach to veterinary drugs in foods • Open to interpretation e.g. portion to which the MRL applies etc	• English speaking • Festival based consumption	• Market entirely dependent on imported products

Model	Strengths	Weaknesses	Trade Opportunities	Trade Threats
China • National & provincial standards • Industry standards • Limited standards available on web	• Adoption of risk analysis framework through membership of Codex • Recognises AQIS health certificates	• Lack of transparency • Port specific interpretation of standards e.g. Cd in crustaceans • State Council acting as de facto Competent Authority	• Port specific opportunities e.g. Shanghai • Prestige associated with exotic imported seafood • Festival based consumption	• Multiplicity of standards • Lack of a national Competent Authority • Ad hoc sampling
Hong Kong • National MRLs • Banned substances • All standards available on the web	• Transparent • Relies on export certification of AQIS	• Mixed border issues with Chinese authorities • No central Competent Authority • No ag vet chemical registration authority	• Consistent • English speaking • Festival based consumption	• Trans-shipment of product onto other markets with different standards (e.g. China)
New Zealand (NZ) • MRLs (not FSANZ MRLs) • 100 ppb default MRL for chemicals with no MRL	• Industry latitude to comply • Increases availability of Ag & Vet chemicals • Defaults to Codex tolerances for imports	• Trade threat for export (e.g. current endosulfan problem with Korea)	• Low, consistent 'hurdle' for industry to jump • Favours domestic trade within Aus/NZ	• Can 'legally' export to Aus despite non-compliance with FSANZ code under NZ opt out clause.

Model	Strengths	Weaknesses	Trade Opportunities	Trade Threats
Japan • MRLs • Banned substances (no ADI set) • 10 ppb 'Uniform Limit' set for chemicals with no MRL • Standards available on the web for some but not all compounds	• Selectively applied to imports with a laissez faire policy applying to domestic product. • Domestic industry latitude to comply with MRLs	• Prescriptive • Costly compliance for exporters to Japan (low LODs) • Constantly changing e.g. malachite green inclusion • Ambiguous • Only some documents in English • Conflict between Health & Agriculture over jurisdiction	• Market opportunities for 'clean product' e.g. SBT • Selection of port can minimise 'problems' with local prefectural authorities.	• *Food Sanitation Law* exemption granted to developing countries e.g. Mexico. • Amendments are published through obscure WTO notifications • Need current information and interpretation of MRL for specific products.
European Union (EU) • MRLs/MLs • Banned substances (no ADI set) • 10 ppb default MRL set for chemicals with no MRL	• Uniformity across EU • Defined sampling methods (portion to which the MRL applies).	• Costly compliance for exporters to the EU (low LODs) • Complex number of amendments to Commission documents (not necessarily in English).	• Exports can pick and choose which port to send product through to avoid a 'problem'. • Trade opportunities for 'clean product' e.g. YTKF into the prestigious EU market	• National Food Authorities have flexibility to test product as they see fit e.g. Spain with cadmium in prawns.

Model	Strengths	Weaknesses	Trade Opportunities	Trade Threats
United States (US) • MRLs • Zero tolerance for chemicals with no MRL. • Prior notification of shipment arrival under US Homeland Security checks	• Uniform across US. • Science-based.	• Only applies to product that crosses state borders i.e. imports. • General ban on all unsanctioned drug residues	• US FDA moving to strengthen its national role over state powers e.g. mercury in fish.	• Strained relationship between US FDA, US EPA and US DA over jurisdictional issues. • Possible spill of China seafood safety row with US FDA to other imported seafood products from other markets.

Appendix 2

Table 2.1 Summary of International research providers and capabilities

R&D provider	Capabilities	Submitted projects	Location	Key researchers
AgriQuality	Commercial laboratory service provider for residues and contaminants including biotoxins. Food forensics, method development, mercury speciation, veterinary drugs, antifoulants	Nil	Wellington & Auckland, New Zealand	Udit Singh
Cawthron Institute	Marine biotoxins	New technologies to improve HAB and biotoxin detection and management for aquaculture	Nelson, New Zealand	Lincoln Mackenzie, Lesley Rhodes, Patrick Holland
Norwegian National Institute of Nutrition and Seafood Research	Predictive modelling of environmental contaminants (dioxins & PCBs) in aquaculture fish (salmon)	Nil	Bergen, Norway	Marc Berntssen
SEAFOODPlus, TRACE, TRACEFISH	Traceability, health claims, public health epidemiology, consumer risk communication, viral (Hepatitis A) & bacterial pathogens (*Vibrio parahaemolyticu*), total chain sustainability, biogenic amines (histamine) & molecular biology	Nil	Lyngby, Denmark	Torger Børresen
Japanese National Institute of Health Sciences	Dioxins and PCBs	Nil	Tokyo, Japan	Tomoaki Tsutsumi, Mitsunori Murayama

R&D provider	Capabilities	Submitted projects	Location	Key researchers
Saga University	Dioxins, PCBs, brominated flame retardants in fish	Nil	Saga, Japan	Daisuke Ueno
Ehime University	Environmental chemistry & ecotoxicology	Nil	Ehime, Japan	Shinsuke Tanabe
National Research Institute of Fisheries & Environment of Inland Sea of the Fisheries Research Agency	Environmental chemistry & ecotoxicology	Nil	Hiroshima, Japan	Kazunori Fujii
Fukuoka Institute of Health & Environmental Sciences	Environmental chemistry & ecotoxicology	Nil	Fukuoka (Hakata), Japan	Takesumi Yoshimura
Japan Food Research Laboratories	Analytical chemistry (testing of imported seafood for Japanese Government)	Nil	Osaka, Japan	Satoshi Isagawa
Kinki University	Mercury speciation	Nil	Nara, Japan	Takeshi Hidaka, Masashi Ando
Fisheries Agency, Ministry of Agriculture, Forestry and Fisheries	Market access	Nil	Yokohama, Japan	Masayuki Komatsu, Daishiro Nagahata
National Veterinary Research and Quarantine Service	Dioxins, PCBs, veterinary drugs	Nil	Seoul, Korea	Song-Keun Byun, Soo Yeon Kim,
Export Inspection Agency within the Indian Ministry of Commerce & Industry	Market access	Nil	Mumbai, India	Deepak Shekhar
City University of Hong Kong	Environmental chemistry & ecotoxicology	Nil	Kowloon, Hong Kong	Paul Lam

R&D provider	Capabilities	Submitted projects	Location	Key researchers
Cross boundary & International Group of the Environmental Protection Department	Exposure assessments	Nil	Wan Chai, Hong Kong	Queenie Ng, Stephanie Ma, Ron Yang
Food & Environmental Hygiene Department	Market access	Nil	Admiralty, Hong Kong	Ka-sing Leung, Howard Wong
Hong Kong Baptist University	Environmental chemistry & ecotoxicology	Nil	Kowloon Tong, Hong Kong	Ming Wong, Gene Zheng
Government Laboratory	Analysis of imported foods	Nil	Ho Man Tin, Hong Kong	William Chung, Clare Ho
Swire Institute of Marine Sciences, University of Hong Kong	Biotoxins, environmental chemistry & ecotoxicology	Nil	Central, Hong Kong	Kenneth Leung
Eurofins	Environmental chemistry & ecotoxicology (major provider of residue testing to aquaculture feed manufacturers)	Nil	Bayreuth, Germany	Horst Rottker
Norwegian Institute of Public Health	Dioxins & PCBs proficiency testing	Nil	Oslo, Norway	Georg Becher, Line Smastuen Haug
Norwegian Institute for Air Research	Environmental chemistry & ecotoxicology	Nil	Tromso, Norway	Dorte Herzke
Nutreco Aquaculture Research Centre	Aquaculture diets & residue testing	Nil	Stavanger, Norway	Kurt Fjellanger
Russian Academy of Sciences	Dioxins & PCBs	Nil	Moscow, Russia	Andrei Cheleptchikov
Bureau of Food & Drug Analysis, Department of Health	Dioxins, PCBs, veterinary drugs in foods	Nil	Taipei, Taiwan	Erick Tsi-Tee Suen

R&D provider	Capabilities	Submitted projects	Location	Key researchers
Taiwan Agricultural Chemicals & Toxic Substances Research Institute	Dioxins, PCBs, pesticides & veterinary drug residues in foods	Nil	Taichung, Taiwan	Feei Sun
Research Centre of Environmental Trace Toxic Substances, National Cheng Kung University	Dioxins, PCBs, pesticides & veterinary drug residues in foods	Nil	Tainan, Taiwan	Ching Chang Lee
Network of Aquaculture Centres in Asia-Pacific	Market access requirements	Nil	Bangkok, Thailand	Pedro Bueno
Kasetsart University	Veterinary drugs in foods	Nil	Bangkok, Thailand	Wanchai Worawattanamateekul, Juta Mookdasanit
Food Standards Agency	Exposure assessment, MRLs setting	Nil	London, United Kingdom	David Mortimer
Veterinary Medicines Directorate	Veterinary drugs, testing of imported seafood, methods of sampling & storage	Nil	Surrey, United Kingdom	Jack Kay
University of Michigan	Dioxins & PCBs	Nil	Michigan, United States	Peter Adriaens
University of Toronto at Scarborough	Dioxins & PCBs, environmental geochemistry	Nil	Toronto, Canada	Frank Wania
Agricultural & Rural Developing Ministry Research Institute for Aquaculture	Aquaculture feed safety, market access	Nil	Haipong, Vietnam	Le Xan

R&D provider	Capabilities	Submitted projects	Location	Key researchers
Ocean University of China	Seafood safety	Nil	Qingdao, China	Lin Hong
Chinese Academy of Inspection & Quarantine	Market access testing	Nil	Beijing, China	Zhong Weike
Chinese Academy of Sciences	Market access for Chinese seafood exports	Nil	Qingdao, China	Lin De Fang
Yellow Sea Fisheries Research Institute	Seafood chemical safety	Nil	Qingdao, China	Xiachuano Li
South China Sea Fisheries Research Institute	Drafting of methods of analysis for Chinese national MRLs	Nil	Guangzhou, China	Chen Shngjun, Genvex Ced
East China Sea Fisheries Research Institute	Seafood safety	Nil	Shanghai, China	Huang Hongliang
National Centre for Quality Supervision & Test of Aquatic Products	Imported seafood residue testing	Nil	Qingdao, China	Zhou Deqing
National Institute of Nutrition & Food Safety	Monitoring & control for contaminants & residues in foods. MRL standards drafting – CODEX	Nil	Beijing, China	Yonging Wu
Institute of Sciences of Food Production	Aquaculture production safety	Nil	Bari, Italy	Angelo Visconti

Appendix 3

Table 3.1 Summary of international seafood detention reports by country (EU data is from 19/5/2003 onwards)

#	Country	Date	Species of seafood	Cause of detention	Levels found	Maximum Level (ML) in importing country (mg/kg)	FSANZ MRL/ML/ERL (mg/kg)	Comments
1	Canada	2006/2007	All	N/A	N/A	N/A	N/A	Nil detentions
2	China	30/5/2007	Prawns & squid	Cadmium & lead	N/A	0.5	Not set	Allegedly 30 T of product detained in Zhanjiang Port, Guangdong Province, China. AQIS has not received any official notification of this detention. Probable spurious report.
3	China	29/8/2007	Crabs	Cadmium	N/A	0.5	Not set	Confusion over Chinese MRLs for cadmium
4	Greece	30/3/2006	King Prawns (*Melicortus latisulcatus* and *M. plebejus*)	Cadmium	N/A	0.5	Not set	
5	Greece	8/5/2006	Prawns (*Metapenaeus endeavouri* and *M. ensis*)	Cadmium	N/A	0.5	Not set	

#	Country	Date	Species of seafood	Cause of detention	Levels found	Maximum Level (ML) in importing country (mg/kg)	FSANZ MRL/ML/ERL (mg/kg)	Comments
6	Greece	1/8/2006	Frozen King Prawns	E452 polyphosphates	N/A	5	Not set	This additive is used as a sequestrant (metal binder), stabiliser and emulsifiers. Also used to retain water during processing and storage. AQIS challenged this notification through the Athens authorities – notification was subsequently retracted.
7	Greece	1/8/2006	Frozen King Prawns	E452 polyphosphates	N/A	5	Not set	This additive is used as a sequestrant (metal binder), stabiliser and emulsifiers. Also used to retain water during processing and storage. AQIS challenged this notification through the Athens authorities – notification was subsequently retracted.
8	Greece	17/7/2007	Frozen prawns	Cadmium	0.76	0.5	Not set	
9	Italy	4/8/2003	Pargo (Snapper)	Parasites	N/A	0.5	Not set	No details of which parasites found were given
10	Italy	12/12/2005	Frozen black tiger shrimps (*Penaeus monodon*)	Cadmium	N/A	0.5	Not set	

#	Country	Date	Species of seafood	Cause of detention	Levels found	Maximum Level (ML) in importing country (mg/kg)	FSANZ MRL/ML/ERL (mg/kg)	Comments
11	Italy	12/12/2005	Frozen black tiger shrimps (*Penaeus monodon*)	Cadmium	N/A	0.5	Not set	
12	Japan	2006/2007	All seafood	N/A	N/A	N/A	N/A	Nil detentions
13	Portugal	21/4/2006	Banana prawns (*Fenneropenaeus* spp.)	Cadmium	N/A	0.5	Not set	
14	Portugal	1/9/2006	Frozen tiger prawns (*Marsupenaeus japonicos, Penaeus esculentus, P. semisulcatus*).	Cadmium	N/A	0.5	Not set	
15	Portugal	7/12/2006	Frozen tiger prawns (*Marsupenaeus japonicus*, *Penaeus esculentus* and *P. semisulcatus*)	Cadmium	N/A	0.5	Not set	
16	Portugal	31/1/2007	Frozen King prawns	Cadmium	N/A	0.5	Not set	
17	Spain	26/11/2004	Frozen prawns	Cadmium	N/A	0.5	Not set	

#	Country	Date	Species of seafood	Cause of detention	Levels found	Maximum Level (ML) in importing country (mg/kg)	FSANZ MRL/ML/ERL (mg/kg)	Comments
18	Spain	30/11/2004	Prawns (*Metapenaeus endeavouri*)	Cadmium	N/A	0.5	Not set	
19	Spain	30/11/2004	Prawns (*Metapenaeus endeavouri*)	Cadmium	N/A	0.5	Not set	
20	Spain	30/11/2004	Prawns (*Metapenaeus endeavouri*)	Cadmium	N/A	0.5	Not set	
21	Spain	28/6/2005	Frozen Banana prawns	Cadmium	N/A	0.5	Not set	
22	Spain	5/7/2005	Frozen raw whole banana prawns (*Fenneropenaeus merguiensis*)	Cadmium	N/A	0.5	Not set	
23	Spain	5/7/2005	Frozen raw whole banana prawns (*Fenneropenaeus merguiensis*)	Cadmium	N/A	0.5	Not set	
24	Spain	6/7/2005	Frozen prawns (*Fenneropenaeus* spp)	Cadmium	N/A	0.5	Not set	

#	Country	Date	Species of seafood	Cause of detention	Levels found	Maximum Level (ML) in importing country (mg/kg)	FSANZ MRL/ML/ERL (mg/kg)	Comments
25	Spain	6/7/2005	Prawns (*Fenneropenaeus* spp)	Cadmium	N/A	0.5	Not set	
26	Spain	6/7/2005	Prawns (*Fenneropenaeus* spp)	Cadmium	N/A	0.5	Not set	
27	Spain	6/7/2005	Prawns (*Fenneropenaeus* spp)	Cadmium	N/A	0.5	Not set	
28	Spain	6/7/2005	Prawns (*Fenneropenaeus* spp)	Cadmium	N/A	0.5	Not set	
29	Spain	6/7/2005	Prawns (*Fenneropenaeus* spp)	Cadmium	N/A	0.5	Not set	
30	Spain	7/7/2005	Prawns (*Fenneropenaeus* spp)	Cadmium	N/A	0.5	Not set	
31	Spain	7/7/2005	Frozen raw whole banana prawns (*Fenneropenaeus merguiensis*)	Cadmium	N/A	0.5	Not set	

#	Country	Date	Species of seafood	Cause of detention	Levels found	Maximum Level (ML) in importing country (mg/kg)	FSANZ MRL/ML/ERL (mg/kg)	Comments
32	Spain	7/7/2005	Frozen raw whole banana prawns (*Fenneropenaeus merguiensis*)	Cadmium	N/A	0.5	Not set	
33	Spain	15/7/2005	Frozen prawns	Cadmium	N/A	0.5	Not set	
34	Spain	20/9/2005	Frozen whole prawns (*Metapenaeus endeavouri* and *ensis*)	Cadmium	N/A	0.5	Not set	
35	Spain	25/11/2005	Whole raw frozen banana prawns	Cadmium	N/A	0.5	Not set	
36	Spain	9/1/2006	Frozen whole raw banana prawns (*Fenneropenaeus merguiensis*)	Cadmium	N/A	0.5	Not set	
37	Spain	2/3/2006	Frozen raw banana prawns	Cadmium	N/A	0.5	Not set	
38	Spain	6/11/2006	Frozen whole raw prawns (*Penaeus* spp)	Cadmium	N/A	0.5	Not set	

#	Country	Date	Species of seafood	Cause of detention	Levels found	Maximum Level (ML) in importing country (mg/kg)	FSANZ MRL/ML/ERL (mg/kg)	Comments
39	Spain	6/11/2006	Frozen whole raw prawns (*Penaeus* spp).	Cadmium	N/A	0.5	Not set	
40	Spain	18/12/2006	Shrimps (*Penaeus* spp)	Cadmium	N/A	0.5	Not set	
41	Spain	18/12/2006	Frozen tiger prawns	Cadmium	N/A	0.5	Not set	
42	Spain	4/6/2007	Frozen king prawns	Cadmium	0.71	0.5	Not set	
43	United States	2006/2007	Swordfish	Histamine	N/A	50/500	200	Fish from QLD

*This list does not include countries which do not have a public notification system for detention (in which case more information may reside in AQIS)

**Test results would be available from AQIS in detailed country detention notification reports

Sources:

European Union (EU): http://ec.europa.eu/food/food/rapidalert/index_en.htm
Japan: http://www.mhlw.go.jp/english/topics/importedfoods/index.html
China: http://www.aqsiq.gov.cn
Canada: http://active.inspection.gc.ca/scripts/fispoi/ial/IALFront.asp?lang=e
United States: http://www.fda.gov/ora/oasis/ora_ref_prod.html

Appendix 4

Table 4.1 Summary of Australian market access and seafood safety research providers

R&D provider	Capabilities	Location	Key researchers	Indicative projects
South Australian Research & Development Institute (UTAS)	Product integrity & market access	Adelaide, SA	David Padula	Through-chain risk assessments for residues & contaminants in seafood. Traceability.
South Australian Research & Development Institute	Risk profiling	Adelaide, SA	Andrew Pointon	Tactical seafood safety and market access R&D
South Australian Research & Development Institute	Shellfish safety	Adelaide, SA	Tom Madigan	Oysters, quality and safety (approved)
South Australian Research & Development Institute	Quantitative risk models	Adelaide, SA	Ben Daughtry	Predictive models for residue management
South Australian Research & Development Institute	Safety assessments	Adelaide, SA	Ian Deleare	Cadmium in prawns
Centre for food safety and Quality, University of Tasmania	Bacterial physiology, microbial ecology & mathematical predictive modelling of food borne microbiological hazards	Hobart, Tas	Mark Tamplin, Tom McMeekin (retired), Tom Ross, John Bowman, David Nichols, Sue Dobson & Lyndal Mellefont	Linked to SARDI project
University of Adelaide	Predictive microbiology	Adelaide, SA	Connor Thomas	Marine *Vibrios* and *Listeria*
Victorian Department of Primary Industries	Molecular genetics	Melbourne, Vic	David Egling, Helen McPartlan and Ben Hayes	Abalone traceability for compliance issues

R&D provider	Capabilities	Location	Key researchers	Indicative projects
Western Australian Department of Fisheries, University of Western Australia	Microbiological shelf life	Perth, WA	Not known	Microbiological study of selected low value supply chains from harvest to retail and development of specific intervention strategies to increase shelf-life and quality and to develop new value added products.
Western Australian Department of Fisheries, Western Australian Department of Health, Western Australian Centre for Pathology and Medical Research, University of Western Australia	Virus laboratory capability	Perth, WA	Not known	Development of Routine Enteric Virus Testing Capacity in Australia
Western Australian Department of Fisheries, Western Australian Department of Environment, Murdoch University	Predictive modelling & biotoxins	Perth, WA	Not known	Development of Predictive Models and Alternative Techniques to Minimise the Effect of Biotoxin Contamination on the Shellfish Industry.
South Australian Research & Development Institute, University of Adelaide, University of Tasmania, Australia Food Safety Centre of Excellence, Regency Technical & Further Education	Shelf life verification & packaging	Adelaide, SA	Connor Thomas (University of Adelaide), John Carragher (SARDI), Richard Musgrove (SARDI)	Spoilage and Packaging

R&D provider	Capabilities	Location	Key researchers	Indicative projects
Queensland Department of Primary Industries and Fisheries	Food processing additive verification	Brisbane, Qld	Steve Slattery, David Williams, Caterina Torrisi, Andrew Baade (DPI&F)	Optimisation of treatment regimes for black spot prevention in prawns. Maintenance of effective residue levels
Unknown	Unknown	Unknown	Sally Williamson (unknown), Jane Oakey (QLD DPI) Pieter Scheerlings (QLD DPI), Kevin Ho (WA Chemistry Centre)	Contaminants found in commercial fish consumed in Australia
Not known (private company)	Barramundi grow-out	Adelaide, SA	Steve Mawer (Southern Barramundi)	Determine residue dynamics of tetracycline in barramundi to provide industry with appropriate withdrawal periods,
Ridley	Commercial aquaculture feed manufacturer	Brisbane, QLD	Mark Porter	Residues & contaminants
Skretting	Commercial aquaculture feed manufacturer	Cambridge, Tas	Rhys Hauler	Residues & contaminants
Australian animal health laboratory (CSIRO)	Diagnostic capability for food pathogens (viruses, parasites, bacteria etc). National reference laboratory for freedom of disease certification.	Geelong, Vic	Mark Crane	Nil
Western Australian Chemistry Centre	Commercial analytical chemistry residue service provider*	Perth, WA	Kevin Ho	Nil

R&D provider	Capabilities	Location	Key researchers	Indicative projects
National Measurement Institute	National metrology centre, Australian Government Analyst (for trade purposes)*	Sydney, NSW	Honway Louie	Nil
Victorian State Chemistry Laboratory	Commercial analytical antimicrobial residue service provider*	Werribee, Vic	Hao Nguyen	Nil
University of Tasmania, Tasmanian Aquaculture and Fisheries Institute	Analytical expertise for biotoxins	Launceston, Tas	Christopher Bolch (TAFI), Miguel de Salas (UTAS School of Plant Science), Andrew Seen (UTAS School of Chemistry), Lyndon Llewellyn and Andrew Negri (Australian Institute of Marine Science)	New technologies to improve HAB and biotoxin detection and management for aquaculture

*Relates to third term of terms of reference on laboratory service capability (Kevin Shiell)

Table 4.2 Summary of Australian and New Zealand research projects undertaken or in progress

R&D provider	Project title	Species	Principal Investigator	Funding source?	Project status
FINFISH					
South Australian Research & Development Institute	Development and validation of baitfish sampling methods to address international residue standards for southern bluefin tuna (*Thunnus maccoyii*)	Southern Bluefin Tuna	David Padula	Aquafin CRC & FRDC	Completed
South Australian Research & Development Institute	Management of food safety hazards in farmed SBT to exploit market opportunities	Southern Bluefin Tuna	David Padula	Aquafin CRC & FRDC	Completed
Firecrest Publications	Mercury in Shark	Shark	Norm Grant	FRDC	Completed
University of Tasmania	A review of the ecological impacts of selected antibiotics and antifoulants currently used in the Tasmanian salmonid farming industry and development of a research programme to evaluate the environmental impact of selected treatments	Salmon	Catriona Macleod	FRDC	In progress
South Australian Research & Development Institute	Identification and Management of Potential Food Safety Issues in Aquaculture-produced Yellowtail Kingfish (*Seriola lalandi*)	Yellowtail Kingfish & Mulloway	David Padula	FRDC	Completed
SHELLFISH					
Cawthron Institute (New Zealand)	Australian Marine Biotoxin Management Plan for Shellfish Farming	Shellfish	Kirsten Todd	FRDC	Completed
South Australian Research & Development Institute	A critical evaluation of supply-chain temperature profiles to optimise food safety and quality of Australian oysters	Oysters	Tom Madigan	Australian Seafood CRC	In progress
NSW Fisheries	Review of Depuration and its Role in Shellfish Quality Assurance	Shellfish	K. Jackson	FRDC	Completed

R&D provider	Project title	Species	Principal Investigator	Funding source?	Project status
AgResearch Limited (New Zealand)	Toxicology of cyclic imines: gymnodimine, spirolides, pinnatoxins, pteriatoxins prorocentrolide, spiro-prorocentrimine & symbioimines	Shellfish	Rex Munday	FRDC	Completed
Ruello & Associates Pty Ltd	Improving Post Harvest Handling To Add Value To Farmed Mussels	Mussels	Nick Ruello	FRDC	Completed
University of Tasmania	Pathogenic *Vibrio parahaemolyticus* in Australian oysters	Oysters	Tom Lewis	FRDC	Completed
University of Adelaide	A supply chain assessment of marine vibrios in oysters: prevalence, quantification and public health risk	Oysters	Connor Thomas	FRDC	Completed
University of New South Wales	Oyster depuration: a re-assessment of depuration conditions and the role of bacterial and viral indicators in determining depuration effectiveness	Oysters	Ken Buckle	FRDC	Completed
University of Tasmania	Vibrios of Aquatic Animals: development of a national standard diagnostic technology	All seafood	Jeremy Carson	FRDC	Completed
South Australian Oyster Research Council	Establish the technical and market data to assess the feasibility of live bivalve mollusc (Australian oysters) access in USA	Oysters	Matthew Muggleton	Australian Seafood CRC	In progress
National Research Centre for Environmental Toxicology & Griffith University	Investigations into the Toxicology of Pectenotoxin-2-seco acid and 7-epi pectenotoxin 2-seco acid to aid in a health risk assessment for the consumption of shellfish contaminated with these shellfish toxins in Australia	Shellfish (mixed species)	Glen Shaw & Vanessa Burgess	FRDC	Completed
MARKET ACCESS					
South Australian Research & Development Institute	A market access guide for seafood exporters: International Residue Standards	All seafood	David Padula	SSA/FRDC & Australian Seafood CRC	In progress

R&D provider	Project title	Species	Principal Investigator	Funding source?	Project status
Seafood Experience Australia Ltd	Development and implementation of an industry education and market awareness program	All seafood	Bob Cox	FRDC	In progress
Not known	Hooking Into Asian Seafood Markets-Outcomes and opportunities	Mixed wild catch	Not known	FRDC	Completed
Queensland Department of Primary Industries	Hooking into Asian Festivals	Mixed	Tony Onley	FRDC	Completed
Australian Business Limited	Identification of New Market Opportunities for Australian Southern Rock Lobster Exports.	Southern Rock lobster	Gee Yap	FRDC	Completed
Not known	Silver Perch Market Assessment	Silver perch	Not known	FRDC	Completed
Queensland Department of Primary Industries	Under-utilised Seafood to Asia A guide for Australian seafood exporters	Mixed wild catch	Kevin Smith	FRDC	Completed
PRODUCT REGISTRATION					
Tuna Boat Owners Association of South Australia	Net fouling management to enhance water quality and southern bluefin tuna performance	Southern Bluefin Tuna	Kirsten Rough	Aquafin CRC	Completed
Aquaculture Development and Veterinary Services Pty Ltd	Registration of Aquaculture Chemicals	Aquaculture species	S Percival	FRDC	Completed
Crop Protection Approvals Ltd	Development And Establishment of a National System for Minor Uses Of Products for the Protection Of Livestock In Aquaculture	Aquaculture	Peter Taylor	FRDC	Completed
TRACEABILITY					
NSW Fisheries & Ruello & Associates Pty Ltd	Waterproof labelling and identification systems suitable for shellfish and other seafood and aquaculture products	Shellfish	Damian Ogburn & Nick Ruello	FRDC	Completed

R&D provider	Project title	Species	Principal Investigator	Funding source?	Project status
PRAWNS					
University of Adelaide & the South Australian Research & Development Institute	Food Safety and Quality Assurance for Green and Cooked Prawns: Development and Evaluation of a Framework for the Validation of a Supply Chain Approach	Prawns	Connor Thomas	FRDC	Completed
University of Adelaide	The Toxicity and sub-lethal Effects of Persistent Pesticides on Juvenile Prawns and a Common Inter-tidal Sea grass Species	Prawns (wild)	BD Williams	FRDC	Completed
Australian Prawn Promotion Association	Australian prawn industry quality standard: development of a third party audited seafood industry quality standard for prawn vessels and processors incorporating food	Prawns	Martin Perkins	FRDC	Completed
QUALITY & SHELF LIFE					
Queensland Department of Primary Industries	Extending The High Quality Life Of Seafood	Mixed	Steve Slattery	FRDC	Completed
Queensland Department of Primary Industries	Evaluating effective quality monitoring methods for the Australian seafood industry	All seafood	Sue Poole	FRDC	Completed

Sources:
Fisheries Research & Development Corporation: www.frdc.com.au Additional information was obtained with the assistance of Mr Justin Fromm (FRDC).
Aquafin CRC: www.aquafincrc.com.au Additional information was obtained with the assistance of Dr Peter Montague (Aquafin CRC)
SSA: www.seafoodservices.com.au Additional information was obtained with the assistance of Mr Justin Fromm (FRDC)
Australian Seafood CRC: www.seafoodcrc.com Additional information was obtained with the assistance of Mr Justin Fromm (FRDC)

Table 4.3 Summary of Australian & New Zealand commercial laboratory providers

Laboratory	National Measurement Institute	AssureQuality	Department of Primary Industries	HPC Holdings trading as Symbio Laboratories	WA Chemistry Centre	Advanced Analytical Australia Pty Ltd	Leeder Consulting
Location	VIC/NSW/WA	Auckland & Wellington (New Zealand)	VIC	QLD	WA	NSW/QLD	VIC
Contact person	Brian Woodward & Emma Tiberi	Harry Van Enckevort & Karen De Lacy	Bruce Shelley	Bruce Chen	Phil Hyde	Attila Tottszer	John Leeder
Address	1 Suakin Street, Pymble NSW 2073 51-65 Clarke Street, South Melbourne VIC 3205	131 Boundary Road, Auckland, New Zealand 1C Quadrant Drive, Lower Hutt (Wellington), New Zealand	621 Sneydes Road, Werribee VIC 3030	44 Brandl Street, Eight Mile Plains, QLD 4113	125 Hay Street, East Perth WA 6004	11 Julius Avenue, North Ryde, NSW 2113	Unit 5, 18 Redland Drive, Mitcham VIC 3132
Phone number	02 9449 0151 03 9685 1777	+64 9 626 6026 +64 4 570 8800	03 9742 8755	07 3340 5700	08 9325 7767	02 9888 9077	03 9874 1988
Accreditation	ISO 17025	IANZ / NATA to ISO 17025 GMP (MedSafe New Zealand) NZ Food Safety Authority LAS Accredited and Approved Laboratory for Dairy and Meat products and USFDA NSSP programme Approved by NZ MAF Quarantine	ISO 17025	ISO 17025	ISO 17025	ISO 17025, AQIS, APVMA	ISO 17025

Laboratory	National Measurement Institute	AssureQuality	Department of Primary Industries	HPC Holdings trading as Symbio Laboratories	WA Chemistry Centre	Advanced Analytical Australia Pty Ltd	Leeder Consulting
		as a Transitional Facility/approved by Australian Quarantine Inspection Service as a Quarantine Approved Premise Inspected by US Department of Agriculture and European Commission Officials Japanese Government (Ministry of Health Labour and Welfare) registration as approved laboratories (New Zealand and Australia).					
International recognition	Not known	New Zealand, Australia, Pacific Islands, EU, Burma, Singapore, Thailand, Korea, Philippines, Malaysia, Hong Kong, Indonesia, Japan, China, Middle East and the US.	Not known	Not known	Not known	Not known	Not known
Proficiency programs	Not known	NZFSA, NARL - ILCSS / NRS LAS (Laboratory Accreditation	Not known	Not known	Not known	Not known	Not known

Laboratory	National Measurement Institute	AssureQuality	Department of Primary Industries	HPC Holdings trading as Symbio Laboratories	WA Chemistry Centre	Advanced Analytical Australia Pty Ltd	Leeder Consulting
		Scheme) IANZ NATA QCT AgriQuality Proficiency Test Programmes AQIS (AUS) FAPAs (UK) Authority of Agricultural Foods and Fisheries (UK) 'QuASIMEME' programme for Domoic Acid, Marine Institute at Galway, Norwegian Institute of Public Health dioxins in foods.					
Ownership	Australian Government Department of Industry, Tourism & Resources	New Zealand State Owned Enterprise under MAF responsible to Minister for Finance	Victorian Government Department of Primary Industries	Not known	WA Government	Not known	Not known
NRS service history	Yes	Yes	Yes	Yes	No	Not known	Not known
Matrices	Seafood, prawn tissue, animal tissue, fish, biota, foods, meat fat & agricultural materials	Fish & fish products, foods, shellfish, agricultural products & agricultural materials, meat & meat products,	Fish, crustaceans, molluscs, fish pastes, foods & agricultural materials, animal tissue, biota	Fish, crustaceans, molluscs, meat & meat products	Fish, crustaceans, molluscs, foods & agricultural materials, biota	Prawns, seafood, fish, biota, crustaceans & molluscs	Foods & agricultural materials, seafood, fish, crustaceans & molluscs

Laboratory	National Measurement Institute	AssureQuality	Department of Primary Industries	HPC Holdings trading as Symbio Laboratories	WA Chemistry Centre	Advanced Analytical Australia Pty Ltd	Leeder Consulting
		biological tissues, muscle & fat tissue					
Metals	Trace elements (not specified), mercury, iodine, dibutyltin, diphenyltin, monobutyltin, monophenyltin, tributyltin, triphenyltin	Aluminium, arsenic, boron, cadmium, cadmium, cobalt, copper, chromium, caesium, iron, mercury, iodine, lithium, manganese, molybdenum, nickel, lead, rubidium, antimony, selenium, tin, strontium, titanium, thallium, uranium, vanadium, tungsten, zinc, magnesium, sodium, potassium,	Aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, calcium, chromium, cobalt, copper, gold, iron, lead, lithium, magnesium, manganese, mercury, molybdenum, nickel, phosphorus, potassium, selenium, silicon, silver, sodium, strontium, sulphur, thallium, tin, vanadium, zinc	Antimony, Arsenic, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, molybdenum, nickel, phosphorus, potassium, selenium, silver, sodium, strontium, titanium, vanadium, zinc	Alkyl tin compounds, aluminum, antimony, arsenic, barium, beryllium, boron, bromide, cadmium, calcium, chloride, chromium, cobalt, copper, fluoride, gallium, gold, iodide, iron, lead, lithium, magnesium, manganese, mercury, molybdenum, nickel, phosphorus, potassium, selenium, silicon, silver, sodium, strontium, sulphate, sulphide, sulphur, tin, titanium,	Aluminum, antimony, arsenic, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, molybdenum, nickel, selenium, silver, vanadium, zinc & methyl mercury	Aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, calcium, cerium, chromium, cobalt, copper, gallium, iron, lead, magnesium, manganese, mercury, molybdenum, nickel, potassium, selenium, silver, sodium, strontium, thallium, titanium, vanadium, zinc

Laboratory	National Measurement Institute	AssureQuality	Department of Primary Industries	HPC Holdings trading as Symbio Laboratories	WA Chemistry Centre	Advanced Analytical Australia Pty Ltd	Leeder Consulting
					thorium, tungsten, uranium, vanadium, zinc		
Pesticides	Herbicides, organochlorine pesticides, organophosphate pesticides	Organochlorine pesticides, organonitrogen pesticides, organophosphorus Pesticides, synthetic pyrethroids, carbamate and dithiocarbamate pesticides, phenoxyacetic acid herbicides	Amino acid herbicides, amitrole, benzoyl ureas, carbamates, chlorfenapyr, cyromazine, dinitroanilines, fungicides, glyphosphate, maleic hydrazide, organochloride pesticides, organophosphorus pesticides, phenoxy alkanoic acids, propargite, pyrethroids, spinosad, synthetic pyrethroids, triazines, uracils, ureas	Nil	Aldrin, chlordane, oxychlordane, dieldrin, diazinon, dimethoate, chlorpyrifos, demeton-s-methyl, fenamiphos, total DDTs, HCB, heptachlor, heptachlor epoxide, lindane, maldison, parathion	Nil	Nil
Dioxins	Polychlorinated dibenzo-p-dioxins 1,2,3,4,6,7,8-heptachlorodibenzo dioxin 1,2,3,4,7,8-hexachlorodibenzod ioxin 1,2,3,6,7,8-hexachlorodibenzod	Polychlorinated dibenzo-p-dioxins & polychlorinated dibenzofurans	Nil	Nil	Nil	Nil	Nil

Laboratory	National Measurement Institute	AssureQuality	Department of Primary Industries	HPC Holdings trading as Symbio Laboratories	WA Chemistry Centre	Advanced Analytical Australia Pty Ltd	Leeder Consulting
	ioxin 1,2,3,7,8,9-hexachlorodibenzodioxin Octachlorodibenzodioxin 1,2,3,7,8-pentachlorodibenzodioxin 2,3,7,8-tetrachlorodibenzodioxin Polychlorinated dibenzofurans 1,2,3,4,6,7,8-heptachlorodibenzofuran 1,2,3,4,7,8,9-heptachlorodibenzofuran 1,2,3,4,7,8-hexachlorodibenzofuran 1,2,3,6,7,8-hexachlorodibenzofuran 1,2,3,7,8,9-hexachlorodibenzofuran 2,3,4,6,7,8-hexachlorodibenzofuran octachlorodibenzofuran 1,2,3,7,8-pentachlorodibenzofuran 2,3,4,7,8-pentachlorodibenzofuran 2,3,7,8-tetrachlorodibenzofuran						
Polychlorinated	**Arochlors**	PCBs (not specified)	PCBs (not	Nil	Nil	Nil	Nil

Laboratory	National Measurement Institute	AssureQuality	Department of Primary Industries	HPC Holdings trading as Symbio Laboratories	WA Chemistry Centre	Advanced Analytical Australia Pty Ltd	Leeder Consulting
Biphenyls (PCBs)	Arochlor 1260 **PCB Congeners** 2,4'-dichlorobiphenyl 2,2',5-trichlorobiphenyl 2,4,4'-trichlorobiphenyl 2,2',3,5'-tetrachlorobiphenyl 2,2',5,5'-tetrachlorobiphenyl 2,3',4,4'-tetrachlorobiphenyl 3,3',4,4'-tetrachlorobiphenyl 2,2',4,5,5'-pentachlorobiphenyl 2,3,3',4,4'-pentachlorobiphenyl 2,3',4,4',5-pentachlorobiphenyl 3,3',4,4',5-pentachlorobiphenyl 2,2',3,3',4,4'-hexachlorobiphenyl 2,2',3,4,4',5'-hexachlorobiphenyl 2,2',4,4',5,5'-		specified)				

Laboratory	National Measurement Institute	AssureQuality	Department of Primary Industries	HPC Holdings trading as Symbio Laboratories	WA Chemistry Centre	Advanced Analytical Australia Pty Ltd	Leeder Consulting
	hexachlorobiphenyl 3,3',4,4',5,5'-hexachlorobiphenyl 2,2',3,3',4,4', 6-heptachlorobiphenyl 2,2',3,4,4',5,5'-heptachlorobiphenyl 2,2',3,4',5,5',6-heptachlorobiphenyl 2,2',3,3',4,4',5,6-octachlorobiphenyl 2,2',3,3',4,4',5,5',6-nonachlorobiphenyl decachlorobiphenyl						
Poly brominated diphenyl ethers (PBDEs)	decabromodiphenyl ether, 2,4-dibromodiphenyl ether, 4,4'-dibromodiphenyl ether, 2,2',3,4,4',5',6-heptabromodiphenyl ether, 2,3,3',4,4',5',6-heptabromodiphenyl ether, 2,2',3,4,4',6,6-heptabromodiphenyl ether, 2,2',3,4,4',5'-hexabromodiphenyl	Polybrominated diphenyl ethers (not specified)	Nil	Nil	Nil	Nil	Nil

Laboratory	National Measurement Institute	AssureQuality	Department of Primary Industries	HPC Holdings trading as Symbio Laboratories	WA Chemistry Centre	Advanced Analytical Australia Pty Ltd	Leeder Consulting
	ether, 2,2',4,4',5,5'-hexabromodiphenyl ether, 2,2',4,4',5,6'-hexabromodiphenyl ether,2,3,4,4',5,6'-hexabromodiphenyl ether, 2,2,3,3',4,4',5,5',6-nonabromodiphenyl ether, 2,2,3,3',4,4',5,6,6-nonabromodiphenyl ether, 2,2,3,3',4,4',5,6'-octabromodiphenyl ether, 2,2,3,3',4,4',6,6'-octabromodiphenyl ether, 2,2',3,4,4'-pentabromodiphenyl ether, 2,2',4,4',5-pentabromodiphenyl ether, 2,2',4,4',6-pentabromodiphenyl ether, 2,3',4,4',6-pentabromodiphenyl ether, 3,3',4,4',5-pentabromodiphenyl ether, 2,2',4,4'-tetrabromodiphenyl ether, 2,2',4,5'-tetrabromodiphenyl ether, 2,3',4,4'-						

Laboratory	National Measurement Institute	AssureQuality	Department of Primary Industries	HPC Holdings trading as Symbio Laboratories	WA Chemistry Centre	Advanced Analytical Australia Pty Ltd	Leeder Consulting
	tetrabromodiphenyl ether, 2,3',4',6-tetrabromodiphenyl ether, 3,3',4,4'-tetrabromodiphenyl ether, 2,2',4'-tribromodiphenyl ether, 2',3,4'-tribromodiphenyl ether, 2,4,4'-tribromodiphenyl ether						
Antibiotics	Chloramphenicol, florfenicol, thiamphenicol	Oxy-tetracycline, beta-lactams, nitromididazoles, Polyether coccidiostats including salinomycin, lasalocid, maduramicin, narasin, monesin, amprolium and nicarbazin, tetracyclines, strepromycin, neomycin, Aminoglycosides, Cephalosporins	Aminoglycosides: apramycin, dihydrostreptomycin, erythromycin, gentamycin, neomycin, streptomycin, amoxicillin, ampicillin,β-lactam, ceftiofur, chlortetracycline, cloxacillin, DMZ, doxycycline, HMMNI, lincomysicn, oxytetracycline, penicillin G, sulphadiazine, sulphadimidine, sulphadoxine, sulphafurazole,	Nil	Nil	Fluoroquinolones: ciprofloxacin, danofloxacin, difloxacin, enrofloxacin, gatifloxacin, moxifloxacin, norfloxacin, ofloxacin, sarafloxacin, Macrolides: erythromycin, lincomycin, oleandomycin, tilmicosin, tylosin, Sulfonamides: sulfachloropyridazine, sulfadiazine, sulfadimethoxine, sulfadimidin, sulfadoxine, sulfamerazine, sulfameter, sulfamethixazole, sulfamethoxypyridazine, sulfapyridine, sulfaquinoxaline, sulfathiazole, sulfatroxazole, sulfisoxazole, Tetracyclines: chlortetracycline,	Oxolinic acid

Laboratory	National Measurement Institute	AssureQuality	Department of Primary Industries	HPC Holdings trading as Symbio Laboratories	WA Chemistry Centre	Advanced Analytical Australia Pty Ltd	Leeder Consulting
			sulphamerazine, sulphameter, sulphapyridine, sulphaquinoxaline, sulphathiazole, sulphatroxazole, tetracycline, tilmicosin, tylosin			doxycycline, erythromycin, oxolinic acid, oxytetracycline, tetracycline, trimethoprim	
Anthelmintics	Nil	Dimetridazole, Carbadox, Benzamidazoles, Imidazothiazoles, Polyether coccidiostats	Nil	Nil	Nil	Nil	Nil
Banned veterinary drugs	Nitrofuran (furaltadone, furazolidone, nitrofurantoin, nitrofurazone) metabolites	Phenicols, nitrofuran metabolites, malachite greem leucomalachite green, anabolic steroids & compounds, carbadox, chloramphenicol, Macrolides, Sulphonamides, Milbemycin group, Beta-agonists, Anticoagulants including Brodifacoum, Flocoumafen, Bromadialone, Amprolium	Nil	Nil	Nil	Chloramphenicol, Nitrofuran (furaltadone, furazolidone, nitrofurantoin, nitrofurazone) metabolites, crystal violet, florphenicol, flumequine, leuco-crystal violet, leucomalachite green, malachite green, thiamphenicol, Malachite green, leuco-malachite green, Beta-lactams: amoxicillin, ampicillin, cloxacillin, penicillin G	Nitrofuran (furaltadone, furazolidone, nitrofurantoin, nitrofurazone) metabolites, Chloramphenicol, Trimethoprim, chlorocycline, doxycycline, oxytetracycline, tetracycline, Leucomalachite green, malachite green, methylene blue

Laboratory	National Measurement Institute	AssureQuality	Department of Primary Industries	HPC Holdings trading as Symbio Laboratories	WA Chemistry Centre	Advanced Analytical Australia Pty Ltd	Leeder Consulting
Steroids	Dienoestrol, diethylstilboestrol, hexoestrol, taleranol, zearalanone, zearalenonl, α & β zearalenol & zeranol	Clenbuterol, stilbenes, oestrogenic substances, androgenic substances,	Nil	Nil	Nil	Nil	Nil
Miscellaneous	Cyromazine, dicyclanil, melamine, 2,4,6-triaminopyrimidine-5-carbonitrile (2,4,6-TP-5-C). Astaxanthin & related cartenoids, Acenaphthene, acenapthylene, anthracene, benz(a) anthracene, benzo (b+k) fluoranthene, benzo(a) pyrene, benzo (ghi) perylene, chrysene, dibenz (ah) anthracene, fluoranthene, fluorene, indeno (1,2,3-cd) pyrene, naphthalene, phenanthrene, pyrene	Polycyclic aromatic hydrocarbons, polychlorinated benzenes & phenols & their derivatives, N-nitrosamines, sodium mono-flouroacetate (1080), fatty acid profile, trans fatty acids, hydrogenated fats, omega 3, omega 6, omega 9, saturated fat, monounsaturated fat, carotenes, polyunsaturated fat, histamine, fluoride, moisture, free fatty acids, peroxide value, carotene, marine bio-toxins.	Biogenic amines, crude fat, fat, moisture, peroxide value, thiobarbituric acid	Anti-oxidants, fat, free fatty acids, moisture, saturated fat,	Colours & preservatives	Nil	Nil
Notes	Anomaly in NATA	Accreditation scope					

Laboratory	National Measurement Institute	AssureQuality	Department of Primary Industries	HPC Holdings trading as Symbio Laboratories	WA Chemistry Centre	Advanced Analytical Australia Pty Ltd	Leeder Consulting
	accreditation for dioxins in biota record.	includes New Zealand Food Safety Authority (Animal Products) National Residue Program					

Sources: National Association of Testing Authorities (www.nata.com.au) and International Accreditation New Zealand (www.ianz.govt.nz)