

# Site identification for aquaculture

## Assessment of chemical contamination in site selection

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# Introduction

**Residues and contaminants represent an unseen risk to any proposed aquaculture development.** Therefore, determining the suitability and safety of a specific aquaculture site with regard to chemical residues is vitally important before any operations begin.

In many cases the main concern is not the direct short-term toxic effects of residues or contaminants, but rather the indirect effects on product quality, food safety, and market access that may arise through bio-magnification processes. Contamination sources commonly arise from current and/or previous land use practises on or around a proposed site. The most likely sources of exposure come from contaminated soil and water, or accidental exposure from unrelated activities.

While residue and contaminants in water and soil pose a real risk to any aquaculture operation, due to the expense in testing soil and water for the wide range of possible contaminants that may exist, **it is recommended that testing only be undertaken when all of the sites other hydrological and physical requirements for aquaculture have been met.**

The following guideline outlines a **minimum 11 step approach** including recommended actions that should be taken in determining the **suitability of a specific site for aquaculture** to reduce potential risks from residues and contaminants.

## Definitions

For the purposes of this guideline the following definitions are used:

**Residues** - are taken to include pesticides and veterinary drugs currently in use or pesticides that are no longer registered for use, but are known to persist in the environment eg some organochlorine chemicals. The residue definition can also include derivatives of the chemical, conversion products, metabolites, reaction products and impurities considered to be of toxicological significance (National Residue Survey National Report 2002-2003).

**Contaminants** - are taken to include substances not intentionally added to a product, but which may be present following routine production. Metals and natural toxicants are contaminants (National Residue Survey National Report 2002-2003).

**Bio-accumulation** - is a general term describing a process by which chemical substances are accumulated by aquatic organisms from water directly or through consumption of food containing the chemicals (Australian Guidelines for Water Quality Monitoring and Reporting, 2000).

**Bio-concentration** - is a process by which there is a net accumulation of a chemical directly from water into aquatic organisms, resulting from simultaneous uptake - for example by gill or epithelial tissue - and elimination (Australian Guidelines for Water Quality Monitoring and Reporting, 2000).

**Bio-magnification** - is the result of the processes of bio-concentration and bio-accumulation by which tissue concentrations of bio-accumulated chemicals increase as the chemical passes up through two or more trophic levels. The term implies an efficient transfer of chemicals from food to consumer so that the residue concentrations increase systematically from one trophic level to the next (Australian Guidelines for Water Quality Monitoring and Reporting, 2000).

# The Eleven Step Approach

## Step 1

### Check the site and regional history

Be aware of a property's land use history. Properties that have been previously used for livestock or cropping may have chemical hotspots, such as buried dips for treating stock, or elevated residue and contaminant background levels from other sources. Potential contaminants for various land uses are given in **Table 1** (page 9). Please note that this list is not exhaustive of all residue and contaminant risks.

#### Recommended actions

1. **Conduct a property search** on the Environmental Protection Agencies (EPA) Environmental Management Register (EMR) and Contaminated Land Register (CLR). The EMR/CLR lists land that has been used for activities that may cause land contamination or is known to be contaminated. In the event that a site is not listed on the EMR/CLR, site specific investigations should be conducted when issues of concern have been identified in developing a site history (see *sources of information*).
2. **Check the National Pollutant Inventory** (NPI) for information on the types, amounts, and effects of pollutants being emitted in a community.
3. **Research** if the property was previously used for sugar cane, cotton, fruit, small vegetable crops, orchard crops or has/had timber cattle and sheep yards built prior to 1987 or old sheep and cattle dips and races.

## Step 2

### Check neighbouring land use

In assessing the suitability of any given site, neighbouring land use must be taken into account. Activities such as aerial spraying and chemical use on livestock may have the potential to contaminate a farm or its water supply. Neighbouring land use is of particular concern for aquaculture, as fish are much more effective in accumulating residues or contaminants than terrestrial species.

#### Recommended actions

1. **Contact neighbouring landholders** whose activities may have the potential to impact on aquaculture production.
2. Try to **strategically place the aquaculture facility** in a position on the land that minimises the potential impacts of neighbouring land use activities.
3. It may be necessary to **sample** land and water during and after periods of **chemical application on adjacent properties** to assess the risk of contamination from neighbouring land use.

## Step 3

### Check the soil

If a property is known to, or is suspected to, have had previous uses that may have resulted in residues or contaminants being put into the soil then testing is strongly recommended.

If the land is listed on the EMR/CLR or has a recent industrial use and is the subject of a development application, referral of the development to the Environmental Protection Agency (EPA) will be triggered. The EPA will review the application, seek additional information where necessary and determine appropriate development conditions related to the site's contamination. The following soil assessment and management issues should be considered early in the planning process.

### Recommended actions

1. **Topsoil should be sampled** for suspected chemical residues, especially in areas where the property's known previous use was, for example, old sugarcane, cotton or pineapple farms. Sampling may include but is not limited to those agents listed in **Tables 1 and 5** (pages 9 and 12). Contaminants of concern for analysis should be carefully identified during the site history assessment.
2. It is recommended **testing of soil only be undertaken when all of a site's hydrological and physical requirements for aquaculture have been met.**
3. **Topsoil should be removed** and only used where it is not in contact with water or where run-off will not enter ponds.
4. **Measures such as lining ponds** may help minimise contamination but only if the source of contamination is from the soil and not in the farm's water source.

## Step 4

### Check water sources

A site's water supply must be considered when assessing site suitability as residues and contaminants can be transported onto the farm via the water supply. Knowing the origin of a site's supply will help in assessing the risk, with water drawn from overland flow, riverine harvesting and underground sources generally representing the highest to lowest risk in respective order.

### Recommended actions

1. **Water drawn from overland flow should be avoided** as much as possible, especially in areas with significant agricultural activity.
2. **Upstream land use practices need to be considered** in determining the suitability of a site's water supply for aquaculture.
3. **Water sampling** should be done for suspected residues and contaminants including, but not limited to, those listed in **Table 1 and 5** (pages 9 and 12).

4. **Determine how water will be transported** throughout the farm, for example, open channels or pipes and/or whether water will be stored in reservoirs.
5. Generally, the **further downstream** you are the greater the chance of an **increased contaminant load**.

## Step 5

### System selection is important

The type of production system to be used must be considered as a factor in assessing the suitability of a site. Different systems will be exposed to different degrees and routes of contamination. In general, the greatest risk of exposure will be in earthen flow-through systems, and the least risk in enclosed recirculating systems.

#### Recommended actions

1. **Consider carefully the type of production system** to be used, for example flow-through or recirculating.
2. **Consider carefully the type of production unit** to be used, for example, pond, tank, or cage.
3. **Determine the production schedule** for the site.
4. **Evaluate the level of risk** posed from the above topics in relation to the specific planned production system and schedule and then sample the area accordingly.

## Step 6

### Consider sources of contamination

Apart from the topics specifically covered in this guideline there may be other sources of contamination specific to any given property or regional area. To reduce the impact of existing or future potential sources of residues and contaminants, the following steps are also recommended when assessing the suitability of a site.

#### Recommended actions

1. **Examine the feasibility of implementing emergency measures** in the event of a contaminant or residue detection in the operation.
2. **Develop a monitoring program** for products, and determine the on-going cost for this at on the site.
3. **Determine** if there will be inputs to the farm that may act as **sources of contamination**, for example, heavy metal content of some fertilizers or feeds used in pond systems, or pesticides that may be used around the farm.

## Step 7

### Consider the species to be used

In the context of assessing site suitability it is also pertinent to consider factors specific to species. Different species will have different responses to both the chronic and acute effects of contaminants and residues. For example, crustaceans are typically much more sensitive to insecticides than fish species.

Dependent on residue or contaminant source and concentration, different species may also be more likely to accumulate contaminants and residues as a result of their feeding habits and diet. For example carnivorous species cultured extensively would be more likely to accumulate residues via bio-magnification processes than omnivorous and herbivorous species respectively from the same system.

### Recommended actions

1. **Always consider** the time taken to produce a crop and how **the production schedule** may coincide with neighbouring land use activities that have the potential to impact on the aquaculture operation.
2. Determine if the **detection of residues or contaminants could arise from bio-concentration or bio-magnification processes.**
3. Consider the **feasibility of implementing purging systems** for some residues and contaminants.
4. Always take into account the **influence of production system choice on a species potential** to accumulate specific residues or contaminants.

## Step 8

### Check Food Standards Australia New Zealand regulations

Food Standards Australia New Zealand (FSANZ) is a bi-national independent statutory authority that develops food standards for composition, labelling and contaminants, including microbiological limits, that apply to all foods produced or imported for sale in Australia and New Zealand.

The Food Standards Code is the national instrument administered by FSANZ, which states the permitted level of contaminants in food. The food Standards Code is available for download from the FSANZ web site (see *sources of information*).

### Recommended actions

1. **Those in the aquaculture industry must understand and follow FSANZ's national Primary Production and Processing Standard for Seafood (Australia only) - Standard 4.2.1.** The standard sets out food safety and suitability requirements for seafood generally from pre-harvesting production of seafood up to, but not including, manufacturing operations. It states that all seafood producers are required to manage the food safety hazards associated with their activity and aquaculture must manage risks associated with inputs to production processes.



2. Individuals participating, or intending to participate, in commercial aquaculture should be aware of the full implications of residue or contaminant detection in marketable product. This includes not just the direct consequences for the individual producer but also the indirect effects for the industry as a whole.

## Step 9

### Consider the risk from metals

FSANZ has established Maximum Levels (MLs) for specific metal contaminants in nominated foods. MLs have been set at levels that are consistent with public health and safety, and which are reasonably achievable from sound production and natural resource management practices - **Table 2** (page 9/10). In order to assist both enforcement agencies, and industry, to maintain contaminant levels at the lowest achievable levels, Generally Expected Levels (GELs) have been established to complement the use of MLs. Unlike MLs and MRLs, GELs are not legally enforceable but provide benchmark levels for presence in foods. GELs are set for **copper, selenium and zinc** in both fish and crustacea. These help producers maintain the lowest achievable levels which pose a low level of risk to consumers. Indicative GELs levels for 90 percent of samples are presented in **Table 3** (page 10).

### Recommended actions

1. Those in the aquaculture industry should **be aware of, and understand, their obligations with regard to the risk from metal contaminants** in seafood production as outlined by FSANZ.
2. It is strongly recommended that people producing aquacultured products for human consumption **incorporate quality assurance measures** as part of production processes to reduce the risk of metal contaminants.

## Step 10

### Be aware of persistent pesticides

Persistent pesticides, which primarily consist of organochlorine pesticides, are considered persistent because they are stable in the environment and resist being broken down. These chemicals may have enduring effects at low concentrations or may bio-accumulate, posing hazards to higher predators. The ability of organochlorine pesticides to persist in the environment made them highly effective and therefore widely used in agriculture and insect control efforts during the 1940s-1970s.

Extraneous Residue Limits (ERLs) are used by FSANZ to indicate the maximum permitted limit of a pesticide residue, arising from environmental sources other than the use of a pesticide directly or indirectly on a food. The values given in **Table 4** (page 11) are maximum limits permitted, if alone, in product flesh. If present with other pesticides, then combination limits apply (see *Foods Standards Code 1.4.2*).

## Recommended actions

1. Those in the aquaculture industry should **be aware of, and understand, their obligations with regard to the risk from pesticides** in seafood production as outlined by FSANZ.
2. It is strongly recommended that people producing aquacultured products for human consumption **incorporate quality assurance measures** as part of production processes.

## Step 11

### Other issues to consider

In addition to the above measures the following recommendations should also be considered.

### Recommended actions

1. **Sampling wild fish populations** in existing water bodies for environmental contaminants.
2. It may be possible to **purge specific contaminants from product in closed systems** supplied with clean contaminate-free water.

## Who can help?

Following is a list of laboratories with the capacity to provide testing services. Individuals should check with the lab to determine sampling fees, and to ensure the lab is NATA accredited prior to conducting testing of the relevant material, for example, soil, water, fish tissue etc.

Please note that this is not an exhaustive list. NATA can be contacted by phoning 07 3870 3844 if further information or advice on sampling and testing is required.

Alternatively, phone the DPI&F Call Centre on 13 23 25 for further information or log on to [www.dpi.qld.gov.au/fishweb](http://www.dpi.qld.gov.au/fishweb).

Laboratory	Type	Phone
Symbio Laboratories	Commercial	07 3391 7558
Queensland Health Scientific Services	Government	07 3274 9087
Australian Laboratory Services Pty Ltd (ALS Environmental)	Commercial	07 3243 7222
National Measurement Institute (NMI)	Government	1800 020 076
Simmonds & Bristow Pty Ltd	Commercial	07 3710 9100

## Conclusion

1. While residue and contaminants in water and soil pose a real risk to any aquaculture operation, due to the expense in testing soil and water for the wide range of possible contaminants that may exist, **it is recommended that testing only be undertaken when all of the sites other hydrological and physical requirements for aquaculture have been met.**
2. When testing is carried out it is recommended that **the most sensitive analytical methods be used** to ensure detection of even the smallest concentrations of residues or contaminants that may be present.
3. It should be noted that **residues and contaminants may be present in the soil and water below the limits of detection** and that testing may not detect residues that are present. Therefore, testing is no guarantee that fish farmed on land at risk will not bio-accumulate or bio-concentrate residues that render them unsaleable.
4. It is strongly recommended that persons assessing the suitability of a site, **research the risks associated with residues and contaminants.** The below sources of information are provided as a starting point for further investigation. It is not an exhaustive list of relevant sources.
5. It is strongly recommended that people producing aquacultured products for human consumption **incorporate quality assurance measures as part of production processes.** Such quality assurance measures should be continued at least until the site has been completely assessed in regards to risk from residues and contaminants.
6. Individuals participating or intending to participate in commercial aquaculture should **be aware of the full implications of residue or contaminant detection in marketable product.** This includes not just the direct consequences for the individual producer but also the indirect effects for the industry as a whole. Aside from the economic impacts of detections, consumer awareness surrounding issues of food safety is increasing and is a topical issue for popular media. Adverse detections of residues or contaminants have the potential to negatively impact not just for the aquaculture industry and its markets but also the seafood industry.

## Information tables

**Table 1**

**Examples of land uses and associated residues or contaminant risk**

Previous land use	Residue or contaminant risk
Sugarcane	BHC, DDT, DDE, DDD Dieldrin, Heptachlor, Aldrin & others
Cotton	Endosulfan ( $\alpha$ & $\beta$ ), Dieldrin, Endrin, Heptachlor, DDT & others
General Horticulture	Chlordane, Aldrin, Dieldrin, Heptachlor, Lindane, Endrin & others
Cattle	Endosulfan ( $\alpha$ & $\beta$ ), Methoxychlor, Endrin, Arsenic & others
Mining	Mercury, Lead, Copper, Cadmium & others

**Table 2**

**Maximum Levels (MLs) of metal contaminants**

Metal contaminant	mg/kg
<b>Arsenic (inorganic)</b>	
Crustacea	2.0
Fish	2.0
Molluscs	1.0
Seaweed (edible kelp)	1.0
<b>Cadmium</b>	
Molluscs (excluding dredge/bluff oysters and queen scallops)	2.0
<b>Lead</b>	
Fish	0.5
Molluscs	2.0
	(cont.)

<b>Mercury</b>	
Crustacea	mean level of 0.5*
Fish (as specified in Schedule 4 to Standard 1.4.2) and fish products, excluding gemfish, billfish including marlin, southern bluefin tuna, barramundi, ling, orange roughy, rays and all species of shark	mean level of 0.5*
Gemfish, billfish (including marlin), southern bluefin tuna, barramundi, ling, orange roughy, rays and all species of shark	mean level of 1.0*
Fish for which insufficient samples are available to analyse in accordance with clause (6) STD 1.4.1.	1.0
Molluscs	mean level of 0.5*
<b>Tin</b>	
All canned foods	250.0

\* A reference to a mean level in the above table is to the mean level of mercury in the prescribed number of sample units as described in clause 6 of FSANZ Standard 1.4.1.

**Table 3**

**Generally Expected Levels (GELs) for metal contaminants**

Product	Copper (mg/kg)	Selenium (mg/kg)	Zinc (mg/kg)
Fish	2	2	15
Crustacea	20	1	40

**Table 4****Extraneous Residue Limits (ERLs) for agricultural chemicals**

<b>Extraneous Agricultural Chemical Limits</b>	<b>Species</b>	<b>mg/kg</b>
Aldrin & Dieldrin	Crustaceans	0.1
	Diadromous Fish	0.1
	Freshwater Fish	0.1
	Marine Fish	0.1
	Molluscs (including Cephalopods)	0.1
BHC	Crustaceans	0.1
	Fish	0.1
	Molluscs (including Cephalopods)	0.1
Chlordane	Crustaceans	0.05
	Fish	0.05
	Molluscs (including Cephalopods)	0.05
DDT	Crustaceans	1
	Fish	1
	Molluscs (including Cephalopods)	1
HCB	Crustaceans	0.1
	Diadromous Fish	0.1
	Freshwater Fish	0.1
	Marine Fish	0.1
	Molluscs (including Cephalopods)	0.1
Heptachlor	Crustaceans	0.05
	Fish	0.05
	Molluscs (including Cephalopods)	0.05
Lindane	Crustaceans	1
	Fish	1
	Molluscs (including Cephalopods)	1

**Table 5****Most common residues and contaminants that should be tested for when determining site suitability**

Residues and contaminants	
DDE	Lindane
DDD	Heptachlor
DDT	Heptachlor epoxide
BHC ( $\alpha$ & $\beta$ ),	Endosulfan ( $\alpha$ & $\beta$ ),
Chlordane (cis- & trans-)	Methoxychlor
Oxychlordane	Lead
Aldrin	Cadmium
Endrin	Mercury
Dieldrin	Copper
HCB	PCB's
Arsenic	

## Sources of information

- 1.1.1. Queensland Department of Primary Industries and Forestry; <http://www.dpi.qld.gov.au/thematiclists/2262.html>
- 1.1.2. Queensland Environmental Protection Agency; [http://www.epa.qld.gov.au/environmental\\_management/land/contaminated\\_land/](http://www.epa.qld.gov.au/environmental_management/land/contaminated_land/)
- 1.1.3. Department of the Environment and Heritage - National Pollutant Inventory; <http://www.npi.gov.au/index.html>
- 1.1.4. Department of the Environment and Heritage – The National Water Quality Management Strategy; <http://www.deh.gov.au/water/quality/nwqms/index.html>
- 1.1.5. Department of the Environment and Heritage – Information for Decisions; <http://www.deh.gov.au/erin/index.html>
- 1.1.6. Australian Pesticides and Veterinary Medicines Authority; <http://www.apvma.gov.au>
- 1.1.7. Food Standards Australia New Zealand; <http://www.foodstandards.gov.au/>
- 1.1.8. Safe Food Queensland; <http://www.safefood.qld.gov.au/>
- 1.1.9. Department of Agriculture Fisheries and Forestry; <http://www.affa.gov.au/>
- 1.1.10. Department of Agriculture Fisheries and Forestry – National Residue Survey; <http://www.affa.gov.au/content/output.cfm?ObjectID=D2C48F86-BA1A-11A1-A2200060B0A05746>
- 1.1.11. National Association of Testing Authorities (NATA); <http://www.nata.asn.au>



# Food Standards Australia New Zealand

## Introduction

Food Standards Australia New Zealand (until recently known as Australia New Zealand Food Authority, ANZFA, formerly the National Food Authority, NFA) is a statutory authority operating under the [Food Standards Australia New Zealand Act 1991](#). The Act provides a focus for cooperation between governments, industry and the community to establish and maintain uniform food regulation in Australia and New Zealand.

Food Standards Australia New Zealand (FSANZ) protects the health and safety of the people in Australia and New Zealand by maintaining a safe food supply.

FSANZ is a bi-national independent statutory authority that develops food standards for composition, labelling and contaminants, including microbiological limits, that apply to all foods produced or imported for sale in Australia and New Zealand.

FSANZ is an integral part of a strong food regulatory system operating between governments at all levels in Australia and New Zealand.



In Australia, FSANZ develops food standards to cover the whole of the food supply chain- from paddock to plate- for both the food manufacturing industry and primary producers.

FSANZ develops food standards with advice from other government agencies, input from stakeholders and food regulatory policies endorsed by the Australia and New Zealand Food Regulation Ministerial Council.

FSANZ decisions are open and accountable, based on the rigorous scientific assessment of any risk to public health and safety.

## FSANZ Mission

- To protect, in collaboration with others, the health and safety of people in Australia and New Zealand through the maintenance of a safe food supply.

The **Food Standards Code** is available on the Food Standards Australia New Zealand website (<http://www.foodstandards.gov.au/>) as a “Word Document”  (Version Microsoft Word 2000) or in a “pdf” format .

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Industry Help Desk: [advice@foodstandards.gov.au](mailto:advice@foodstandards.gov.au)

The **Food Standards Code** is available on the Food Standards Australia New Zealand website (<http://www.foodstandards.gov.au/>) as a “Word Document”  (Version Microsoft Word 2000) or in a “pdf” format .

# Australian New Zealand Food Standards Code

## FSANZ STANDARDS FOR AQUATIC ANIMALS

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### Introduction

This is an unofficial consolidated and summarised version of the Australia New Zealand Food Standards Code (Code) provided for your convenience only. The Code published in the [Gazette](#) is the official legal document that is given legal force via State, Territory, Commonwealth and New Zealand food legislation. You are advised to refer to the Code published in the [Gazette](#) for legal purposes.

The information presented here is a summary of Chapter 1 - General Food Standards of the code that relates to fish, molluscan and crustacean produce. Chapter 1 of the code deals with standards that apply to all foods, however, New Zealand regulates its own Maximum Residue Limits (MRLs) for food, and Standard 1.4.2 regulates MRLs in Australia only.

The maximum permissible limits for agricultural and veterinary chemical residues present in fish, molluscan and crustaceans are listed below. Schedule 1 lists all of the agricultural and veterinary chemical limits for fish, molluscan and crustaceans. If a maximum residue limit for an agricultural or veterinary chemical is not listed in Schedule 1 there must be no detectable residues of that agricultural or veterinary chemical in that food. Schedule 2 lists all extraneous agricultural chemical limits in particular foods. If an extraneous residue limit for an agricultural chemical in a food is not listed in Schedule 2 there must be no detectable residues of that agricultural chemical in that food. Schedule 3 groups certain agricultural or veterinary chemicals according to their chemical groups. Commodity and commodity groups which are referred to in this Standard are listed in Schedule 4. Schedule 4 also specifies the part of the commodity to which the maximum or extraneous residue limit refers.

### Sections

Schedule 1	Maximum residue limits
Schedule 2	Extraneous residue limits
Schedule 3	Chemical groups
Schedule 4	Foods and classes of food
Contaminants & Natural Toxicants	

## Meaning

- (1) Commodity names specified in Schedule 4 of this Standard may differ to those used in other parts of the Australian New Zealand Food Standards Code.
- (2) Commodity names specified in Schedule 4 apply only for the purposes of Standard 1.4.2 and Standard 1.4.1.
- (3) In this document –

**chemical** means an agricultural or veterinary chemical listed in bold type in the shaded boxes in Schedules 1 or 2.

**extraneous residue limit (ERL)** means the maximum permitted limit of a pesticide residue, arising from environmental sources other than the use of a pesticide directly or indirectly on the food, expressed in milligrams of the chemical per kilogram of the food (mg/kg).

**food** means either a food or class of foods listed in unbolded type in Schedules 1, 2 or 4.

**maximum residue limit (MRL)** means the maximum level of a chemical which is permitted to be present in a food, expressed in milligrams of the chemical per kilogram of the food (mg/kg) unless otherwise stated.

**residue definition** means the residue to which the MRL or ERL applies for each chemical compound, appearing below the chemical listed in the shaded boxes in Schedules 1 and 2 of the full Standard 1.4.2 of the Food Standards Code.

**maximum level (ML)** means the maximum level of a specified contaminant, or specified natural toxicant, which is permitted to be present in a nominated food expressed, unless otherwise specified, in milligrams of the contaminant or the natural toxicant per kilogram of the food (mg/kg).

**generally expected levels (GEL)** have been introduced to for certain metal contaminants to help manufacturers maintain the lowest achievable levels of contaminants in food.

### Maximum residue limits

- (1) The permitted MRL for a chemical in food is listed in Schedule 1.
- (2) If an MRL for a chemical is not listed in this Standard there must be no detectable residue of that chemical in that food.

### Extraneous residue limits

- (1) The permitted ERL for a chemical in food is listed in Schedule 2.
- (2) If an ERL for a chemical is not listed in this Standard there must be no detectable residue of that agricultural chemical in that food.

### **Determination of maximum and extraneous residue limits**

- (1) Schedule 4 of this Standard specifies the portion of food to which the MRL or ERL applies.
- (2) Unless Schedules 1 or 2 specify a separate MRL or ERL for a processed food, the MRL or ERL applies to that food whether raw or processed.
- (3) Where a food contains more than one of the chemicals listed in any group in Schedule 3 of this Standard, the combined proportions of those chemicals must not exceed unity.
- (4) Where there is no MRL or ERL specified for a chemical in a food which has ingredients, the MRL or ERL of the chemical in that food is the combined proportionate quantities of the MRL or ERL specified for the ingredients of that food.

### **Maximum levels**

- (1) In this Standard arsenic is considered to be a metal.
- (2) Where food contains a metal and any other chemical species of that metal, all chemical species of that metal must be expressed as the metal.
- (3) The maximum level must be calculated for the edible content of the food that is ordinarily consumed.
- (4) The level for seaweed (edible kelp) whether dried, dehydrated, concentrated or not is to be calculated with respect to the mass of the seaweed at 85% hydration.

### **Generally Expected Levels**

- (1) Have only been established for those contaminant/commodity combinations where the safety assessment indicated a low level of risk to the consumer and where adequate data were available.

## Schedule 1 - Maximum Residue Limits

Maximum Residue Limits for permissible agricultural and veterinary chemical residues listed for fish, molluscs and crustaceans. If a maximum residue limit for an agricultural or veterinary chemical is not listed in Schedule 1 there must be no detectable residues of that agricultural or veterinary chemical in that food.

Please note that only agricultural and veterinarian chemicals listed for use in fish, molluscs and crustaceans are presented in this table.

Table 1 Listed agricultural and veterinary products and there permissible levels in fish, molluscan and crustaceans.

Agricultural or Veterinary Chemical Residue	Species	mg/kg
Benzocaine	Abalone	T*0.5
	Finfish	T*0.5
Cypermethrin	All Other Foods	*0.01
Isoeugenol	Diadromous Fish (whole commodity)	100
	Freshwater Fish (whole commodity)	100
	Marine Fish (whole commodity)	100
Oxolinic Acid	Salmon, Pacific	*0.01
Oxytetracycline	Salmonoids	T*0.2
Trifluralin	Prawns	T*0.001
	Shrimps	T*0.001

\* denotes that the maximum residue limit is set at or about the limit of determination.

T denotes that the maximum residue limit is a temporary maximum residue limit.

Table 2 Agricultural and veterinarian chemicals listed in Schedule 1 that *are not* listed for use in fish, molluscs and crustaceans are presented below.

Agricultural and veterinarian chemicals not listed for use in fish, molluscs and crustaceans			
Abamectin	Chloridazon	Endosulfan	Inorganic bromide
Acephate	Chlormequat	Endothal	Iodosulfuron methyl
Acetamiprid	Chloropicrin	Enilconazole	Ioxynil
Acifluorfen	Chlorothalonil	Eprinomectin	Iprodione
Albendazole	Chlorpropham	EPTC	Isofenphos
Albendazole sulphoxide	Chlorpyrifos	Erythromycin	Isoxaflutole
Aldicarb	Chlorpyrifos-methyl	Esfenvalerate	Ivermectin
Aldoxycarb	Chlorsulfuron	Ethametsulfuron methyl	Ketoprofen
Aliphatic alcohol ethoxylates	Chlortetracycline	Ethephon	Kitasamycin (cont.)

Alloxydim	Chlorthal-dimethyl	Ethion	Kresoxim-methyl
Alloxydim sodium	Clavulanic acid	Ethofumesate	Lambda-cyhalothrin
Altrenogest	Clethodim	Ethopabate	Lasalocid
Aluminium phosphide	Clodinafop-propargyl	Ethoprophos	Levamisole
Ametryn	Clodinafop acid	Ethoxyquin	Lincomycin
Aminoethoxyvinylglycine	Clofentezine	Ethyl formate	Lindane
Amitraz	Clomazone	Ethylene dichloride (EDC)	Linuron
Amitrole	Clopyralid	Etridiazole	Lufenuron
Amoxicillin	Cloquintocet-mexyl	Famphur	Maduramicin
Ampicillin	Cloquintocet acid	Fenamiphos	Magnesium phosphide
Amprolium	Clorsulon	Fenarimol	Malathion
Apramycin	Closantel	Fenbendazole	Maldison
Asulam	Cloxacillin	Fenbutatin oxide	Maleic hydrazide
Atrazine	Coumaphos	Fenchlorazole-ethyl	Mancozeb
Avermectin B1	Cyanamide	Fenchlorphos	MCPA
Avilamycin	Cyanazine	Fenhexamid	MCPB
Avoparcin	Cyclanilide	Fenitrothion	Mebendazole
Azaconazole	Cyfluthrin	Fenoprop	Mecoprop
Azamethiphos	Cyhalothrin	Fenoxaprop-ethyl	Mefenpyr-diethyl
Azaperone	Cypermethrin	Fenoxycarb	Meloxicam
Azinphos-methyl	Cyproconazole	Fenpyroximate	Mepiquat
Azoxystrobin	Cyprodinil	Fenthion	Mesosulfuron-methyl
Bacitracin	Cyromazine	Fentin	Metalaxyl
Benalaxyl	2,4-D	Fenvalerate	Metaldehyde
Bendiocarb	Daminozide	Fipronil	Metasulfuron-methyl
Benfluralin	2,4-DB	Flamprop-methyl	Methabenzthiazuron
Benomyl	Deltamethrin	Flamprop-M-methyl	Methacrifos
Bensulfuron-methyl	Dexamethasone and Dexamethasone trimethylacetate	Flavophospholipol	Metham
Bensulide	Diafenthiuron	Fluazifop-butyl	Metham-sodium
Bentazone	Diazinon	Fluazifop-p-butyl	Methamidophos
Benzofenap	Dicamba	Fluazinam	Methazole
Benzyladenine	Dichlobenil	Fluazuron	Methidathion
Benzyl G penicillin	Dichlofluanid	Flucythrinate	Methiocarb
Betacyfluthrin	Dichlorprop	Fludioxonil	Methomyl
Bifenthrin	Dichlorvos	Flumethrin	Methoxyfenozide
Bitertanol	Diclazuril	Flumetsulam	Methyl benzoquate
Brodifacoum	Diclobutrazol	Flunixin	Methyl bromide
Bromacil	Diclofop-methyl	Fluometuron	Metiram
Bromochloromethane	Dicloran	Fluorine (inorganic salts)	Metolachlor
Bromopropylate	Dicofol	Flupropanate	Metosulam
Bromoxynil	Dicyclanil	Fluquinconazole	Metribuzin
Bupirimate	Dieldrin	Fluroxypyr	Metsulfuron-methyl
Buprofezin	Difenoconazole	Flusilazole	Mevinphos
Butafenacil	Diflubenzuron	Flutolanil	Molinate (cont.)

Butoxydim	Diflufenican	Flutriafol	Monensin
Cadusafos	Dimethipin	Fluvalinate	Morantel
Captan	Dimethirimol	Fosetyl aluminium	Moxidectin
Carbaryl	Dimethoate	Furathiocarb	MSMA
Carbendazim	Dimethomorph	Glufosinate and Glufosinate-ammonium	Myclobutanil
Carbetamide	Dimetridazole	Glyphosate	Naled
Carbofuran	Dinitolmide	Guazatine	Naphthalene acetic acid
Carbon disulphide	Dinitro-o-toluamide	Halofuginone	Naphthalophos
Carbonyl sulphide	Dinocap	Halosulfuron-methyl	Napropamide
Carbosulfan	Diofenolan	Haloxyfop	Naptalam
Carboxin	Diphenamid	Hexaconazole	Narasin
Carfentrazone-ethyl	Diphenylamine	Hexazinone	Neomycin
Ceftiofur	Diquat	Hexythiazox	Netobimin
Cefuroxime	Disulfoton	Hydrogen phosphide	Nicarbazin
Cephalonium	Dithianon	Imazalil	Nitrothal-isopropyl
Cephapirin	Dithiocarbamates	Imazamox	Nitroxynil
Chinomethionat	Diuron	Imazapic	Norflurazon
Chlorfenapyr	Dodine	Imazapyr	Norgestomet
Chlorfenvinphos	Doramectin	Imazethapyr	Novaluron
Chlorfluazuron	2,2-DPA	Imidacloprid	Novobiocin
Chlorhexidine	EDC	Imidocarb (dipropionate salt)	ODB
Abamectin	Emamectin	Indoxacarb	Olaquinox
Oleandomycin	Prochloraz	Spectinomycin	Tiamulin
Omethoate	Procymidone	spinosad	Tilmicosin
OPP	Profenofos	spiramycin	Tolclofos-methyl
Oryzalin	Promacyl	Spiroxamine	Tolfenamic acid
Oxabetrinil	Promecarb	Streptomycin and Dihydrostreptomycin	Toltrazuril
Oxadixyl	Prometryn	Sulfosulfuron	Tolyfluanid
Oxamyl	Propachlor	Sulphadiazine	Tralkoxydim
Oxfendazole	Propamocarb	Sulphadimidine	Trenbolone acetate
Oxycarboxin	Propanil	Sulphadoxine	Triadimefon
Oxyclozanide	Propaquizafop	Sulphaquinoxaline	Triadimenol
Oxydemeton-methyl	Propargite	Sulphatroxazole	Triallate
Oxyfluorfen	Propazine	Sulprofos	Triasulfuron
Oxythioquinox	Propetamphos	Tebuconazole	Tribenuron-methyl
Paclobutrazol	Propiconazole	Tebufenozide	Trichlorfon
Paraquat	Propineb	Tebufenpyrad	Trichloroethylene
Parathion-methyl	Propoxur	Tebuthiuron	Triclabendazole
Parbendazole	Propyzamide	Temephos	Triclopyr
Pebulate	Prothiofos	Tepraloxydim	Tridemorph
Penconazole	Pymetrozine	Terbacil	Trifloxystrobin
Pencycuron	Pyrazophos	Terbufos	Trifloxysulfuron sodium
Pendimethalin	Pyrethrins	Terbutryn	Triflumizole
Permethrin	Pyridaben	Tetrachlorvinphos	Triflururon (cont.)



Phenmedipham	Pyridate	Tetracycline	Triforine
Phenothrin	Pyrimethanil	Tetradifon	Trinexapac-ethyl
2-Phenylphenol	Pyriproxyfen	Thiabendazole	Triticonazole
Phorate	Pyriothiobac sodium	Thiacloprid	Trimethoprim
Phosmet	Quinoxifen	Thiamethoxam	Tylosin
Phosphine	Quintozene	Thidiazuron	Uniconazole-p
Phosphorous acid	Quinzalofop-ethyl	Thifensulfuron	Vamidothion
Picloram	Quizalofop-p-tefuryl	Thiobencarb	Virginiamycin
Picolinafen	Ractopamine	2-(thiocyanomethylthio) benzothiazole	zeranol
Piperonyl butoxide	Rimosulfuron	Thiodicarb	Zetacypermethrin
Pirimicarb	Salinomycin	Thiometon	Zinc Phosphide
Pirimiphos-methyl	Semduramicin	Thiophanate	Zineb
Praziquantel	Sethoxydim	Thiophanate-methyl	Ziram
Procaine penicillin	Simazine	Thiram	

## Schedule 2 - Extraneous Residue Limits

Table 3 Extraneous residue limits for agricultural chemicals listed in Schedule 2.

Extraneous Agricultural Chemical Limits	Species	mg/kg
Aldrin & Dieldrin	Crustaceans	0.1
	Diadromous Fish	0.1
	Freshwater Fish	0.1
	Marine Fish	0.1
	Molluscs (including Cephalopods)	0.1
BHC	Crustaceans	0.1
	Fish	0.1
	Molluscs (including Cephalopods)	0.1
Chlordane	Crustaceans	0.05
	Fish	0.05
	Molluscs (including Cephalopods)	0.05
DDT	Crustaceans	1
	Fish	1
	Molluscs (including Cephalopods)	1
HCB	Crustaceans	0.1
	Diadromous Fish	0.1
	Freshwater Fish	0.1
	Marine Fish	0.1
	Molluscs (including Cephalopods)	0.1
Heptachlor	Crustaceans	0.05
	Fish	0.05
	Molluscs (including Cephalopods)	0.05
Lindane	Crustaceans	1
	Fish	1
	Molluscs (including Cephalopods)	1

### Schedule 3 - Chemical Groups

Table 4 Agricultural and veterinary chemicals and their chemical groups.

Group	Chemicals
Group A	Aldrin, Dieldrin, Endosulfan, Heptachlor
Group B	BHC and its isomers, DDT, Dicofol, Fenarimol, Lindane, Quintozene
Group C	Azamethiphos, Azinphos-ethyl, Azinphos-methyl, Coumaphos, Demeton, Diazinon, Dichlorvos, Dimethoate, Disulfoton, Dithianon, Ethion, Ethoprophos, Famphur, Fenamiphos, Fenchlorphos, Fenitrothion, Fenthion, Formothion, Maldison, Methamidophos, Methidathion, Mevinphos, Naphthalophos, Omethoate, Parathion-methyl, Phorate, Phosmet, Pirimiphos-ethyl, Pirimiphos-methyl, Prothiophos, Pyrazophos, Sulprofos, Temephos, Tetrachlorvinphos, Thiometon, Tributylphosphorotrithioate, Trichlorfon, Vamidothion
Group D	Mancozeb, Metiram, Propineb, Thiram, Zineb, Ziram
Group E	2,4-D, Diclofop-methyl, MCPA, MCPB, Picloram
Group F	Aldicarb, Bendiocarb, Carbaryl, Iprodione, Methomyl, Oxamyl, Phenisopham, Promacyl, Promecarb, Propoxur, Thiobencarb
Group G	Diuron, Fluometuron, Linuron, Methabenzthiazuron, Thidiazuron
Group H	Parbendazole, Thiabendazole
Group I	Benomyl, Carbendazim, Thiophanate, Thiophanate-methyl
Group J	Ametryn, Atrazine, Cyanazine, Metribuzin, Prometryn, Propazine, Simazine, Terbutryn
Group K	Metolachlor, Propachlor
Group L	Chlormequat, Diquat, Paraquat
Group M	Captan
Group N	Ethylene dibromide (EDB), Ethylene dichloride, Methyl bromide, Trichloroethylene
Group O	Fenbutatin Oxide
Group P	Cypermethrin, Deltamethrin, Fenvalerate, Permethrin, Pyrethrins
Group Q	Etridiazole
Group R	Dithiocarbamates, Mancozeb, Metham, Metiram, Propineb, Thiram, Ziram

## Schedule 4 - Foods and Classes of Foods

### **Fish, Crustaceans and Molluscs**

Fish includes freshwater fish, diadromous fish and marine fish.

#### **Diadromous fish**

Diadromous fish include species which migrate from the sea to brackish and/or fresh water and in the opposite direction. Some species are domesticated and do not migrate. The fleshy parts of the animals and, to a lesser extent, roe and milt are consumed.

*Commodities:* Barramundi; Salmon species; Trout species; Eel species.

Portion of the commodity to which the MRL applies (and which is analysed): whole commodity including bones and head (in general after removing the digestive tract).

#### **Freshwater fish**

Freshwater fish include a variety of species which remain lifelong, including the spawning period, in fresh water. Several species of freshwater fish are domesticated and bred in fish farms. The fleshy parts of the animals and, to a lesser extent, roe and milt are consumed.

*Commodities:* a variety of species

Portion of the commodity to which the MRL applies (and which is analysed): whole commodity including bones and head (in general after removing the digestive tract).

#### **Marine fish**

Marine fish generally live in open seas and are almost exclusively wild species. The fleshy parts of the animals and, to a lesser extent, roe and milt are consumed.

*Commodities:* a variety of species.

Portion of the commodity to which the MRL applies (and which is analysed): whole commodity including bones and head (in general after removing the digestive tract).

### **Molluscs** – and other marine invertebrates

Molluscs includes Cephalopods and Coelenterates. Cephalopods and Coelenterates are various species of aquatic animals, wild or cultivated, which have an inedible outer or inner shell (invertebrates). A few species of cultivated edible land snails are included in this group. The edible aquatic molluscs live mainly in brackish water or in the sea.

*Commodities:* Clams; Cockles; Cuttlefish; Mussels; Octopus; Oysters; Scallops; Sea-cucumbers; Sea urchins; Snails, edible; Squids.

Portion of the commodity to which the MRL applies (and which is analysed): whole commodity after removal of shell.

### **Crustaceans**

Crustaceans include various species of aquatic animals, wild and cultivated, which have an inedible chitinous outer shell. A small number of species live in fresh water, but most species live in brackish water and/or in the sea.

Crustaceans are largely prepared for wholesale and retail distribution after catching by cooking or parboiling and deep freezing.

*Commodities:* Crabs; Crayfish; Lobsters; Prawns; Shrimps.

Portion of the commodity to which the MRL applies (and which is analysed): whole commodity or the meat without the outer shell, as prepared for wholesale and retail distribution.

## Contaminants & Natural Toxicants

FSANZ has established Maximum Levels (MLs) for specific metal contaminants in nominated foods. MLs have been set at levels that are consistent with public health and safety and which are reasonably achievable from sound production and natural resource management practices (Table 5). In order to assist both enforcement agencies and industry to maintain contaminant levels at the lowest achievable levels, Generally Expected Levels (GELs), have been established to complement the use of MLs. Unlike MLs and MRLs, GELs are not legally enforceable but provide benchmark levels for presence in foods. GELs are set for copper, selenium and zinc in both fish and crustacea. These help producers maintain the lowest achievable levels which pose a low level of risk to consumers. Indicative GELs levels for 90 percent of samples are presented in Table 6.

Table 5 Maximum Levels (MLs) of metal contaminants

Metal Contaminant	mg/kg
<b>Arsenic (inorganic)</b> Crustacea Fish Molluscs Seaweed (edible kelp)	2 2 1 1
<b>Cadmium</b> Molluscs (excluding dredge/bluff oysters and queen scallops)	2
<b>Lead</b> Fish Molluscs	0.5 2
<b>Mercury</b> Crustacea  Fish (as specified in Schedule 4 to Standard 1.4.2) and fish products, excluding gemfish, billfish (including marlin), southern bluefin tuna, barramundi, ling, orange roughy, rays and all species of shark Gemfish, billfish (including marlin), southern bluefin tuna, barramundi, ling, orange roughy, rays and all species of shark Fish for which insufficient samples are available to analyse in accordance with clause (6) STD 1.4.1. Molluscs	mean level of 0.5* mean level of 0.5* mean level of 1* 1 mean level of 0.5*
<b>Tin</b> All canned foods	250

\* A reference to a mean level in the above table is to the mean level of mercury in the prescribed number of sample units as described in clause 6 of FSANZ Standard 1.4.1.

Table 6 Generally Expected Levels (GELs) for metal contaminants.

Product	Copper (mg/kg)	Selenium (mg/kg)	Zinc (mg/kg)
Fish	2	2	15
Crustacea	20	1	40

To commence on 26 May 2006

### ***STANDARD 4.2.1***

**Note on commencement:**

Subclause 1(2) of Standard 1.1.1 applies to these amendments to the Food Standards Code. The effect of this subclause is that a food is taken to comply with Standard 4.2.1 (below) for a period of 12 months after the commencement of the Standard, provided the food otherwise complied with the Food Standards Code. This means that seafood producers have 2 years from the gazettal of Standard 4.2.1 before they are required to comply with the new requirements.

**[1]** *Standard 3.2.1 of the Australia New Zealand Food Standards Code is varied by omitting subclause 2(2), substituting -*

(2) Unless expressly provided elsewhere in this Code, this Standard applies to all food and primary food production businesses that are determined by the appropriate enforcement agency under the Act to be within a priority classification of food business from the commencement date for that priority classification of food business.

[2] *The Australia New Zealand Food Standards Code is varied by inserting after Standard 3.3.1 -*

## **STANDARD 4.2.1**

### ***Primary Production and Processing Standard for Seafood***

**(AUSTRALIA ONLY)  
TO COMMENCE ON 26 MAY 2006**

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#### **Purpose and commentary**

This Standard sets out food safety and suitability requirements for seafood generally from pre-harvesting production of the seafood up to, but not including manufacturing operations. Chapter 3 of this Code applies to seafood manufacturing and retail sale activities.

Under this Standard, a seafood business must identify potential seafood safety hazards and implement controls that are commensurate with the risk.

Additionally, this Standard requires primary producers and processors of certain bivalve molluscs to implement a food safety management system. This particular requirement also extends to manufacturing activities relating to bivalve molluscs.

For primary producers and processors of bivalve molluscs, the food safety management system incorporates conditions on the areas from which the product may be harvested or harvested for depuration or relaying, along with conditions on the water used for wet storage.

#### **Table of Provisions**

##### Division 1 – Preliminary

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- 2 Interpretation

##### Division 2 – General seafood safety requirements

- 3 General seafood safety management
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- 5 Inputs and harvesting areas
- 6 Seafood storage
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##### Division 3 – Harvesting and other requirements for bivalve molluscs

- 15 Interpretation
- 16 Food safety management systems for bivalve molluscs
- 17 Co-mingling of bivalve molluscs



## Clauses

### Division 1 – Preliminary

#### 1 Application

- (1) This Standard applies to seafood businesses and seafood handlers in Australia but not in New Zealand.
- (2) Unless the contrary intention appears in this Standard, Chapter 3 of this Code applies to seafood manufacturing and retail sale activities.

**Editorial note:**

This Standard applies to primary production and processing activities as defined in clause 2. The definition of 'processing of seafood' includes activities such as the killing, gutting, filleting, brining and shucking of seafood and the depuration of shellfish. However, other than the food safety management system requirements for bivalve molluscs, this Standard does not apply to manufacturing activities.

Manufacturing of seafood is defined in clause 2 as the canning, smoking or crumbing of the seafood or the addition of other foods to the seafood and other like activities.

Under the *Imported Food Control Act 1992*, Standards in this Code apply to imported food. However, this Standard does not fall within the scope of the 'Agreement Between the Government of Australia and the Government of New Zealand Concerning a Joint Food Standards System'. Accordingly, this Standard does not apply to food businesses in New Zealand. Furthermore, the Trans-Tasman Mutual Recognition Arrangement and the Australian and New Zealand legislation giving effect to that Arrangement apply to imported food.

This Standard does not apply to persons who harvest or catch seafood for recreational, cultural or traditional purposes, provided the activity does not come within the definition of a 'seafood business' – that is, the seafood harvested or taken is not intended for sale.

Clause 3 of this Standard does not affect the operation of Standard 3.2.1.

## 2 Interpretation

(1) Unless the contrary intention appears, the definitions in Chapter 3 of this Code apply for the purposes of this Standard.

(2) In this Standard -

**control** means a measure that prevents, eliminates or reduces to an acceptable level, a food safety hazard.

**deuration** means a process using a controlled environment to reduce the level of certain pathogenic organisms that may be present in live shellfish and crustaceans.

**harvesting** means the capture or taking of seafood and includes the capture or taking of seafood from an enclosure or pond used in aquaculture.

**inputs** includes any feed, chemicals or other substances used in, or in connection with, the primary production of seafood.

**live seafood premises** means a premises used for the primary production of live seafood, and includes sea cages.

**manufacturing of seafood** means the canning, smoking or crumbing of seafood or the addition of other food to seafood and other like activities.

**primary production of seafood** means the –

- (a) growing, cultivation, picking, harvesting, collection or catching of seafood; or
- (b) growing on of seafood; or
- (c) transportation or delivery of seafood; or
- (d) holding of live seafood;

and includes processing of seafood.

**processing of seafood** includes –

- (a) the killing, dismembering, filleting or cutting into portions, gill or gutting, or skinning of seafood; and
- (b) the deuration of shellfish and crustaceans; and
- (c) the shucking or peeling of seafood; and
- (d) the cooking, including steaming or boiling, of crustaceans; and
- (e) the brining of seafood; and
- (f) the packing, treating, washing, freezing, refrigeration or storing of seafood; and
- (g) other similar activities.

**Editorial note:**

The definitions of 'primary production of seafood' and 'processing of seafood' operate for the purposes of this Standard and do not affect the definition of those terms in State and Territory Food Acts. The definitions in this Standard do not affect the legislative or administrative arrangements in the States and Territories concerning the administration and implementation of legislative schemes.

**seafood** means all aquatic vertebrates and aquatic invertebrates intended for human consumption, but excludes amphibians, mammals, reptiles, and aquatic plants.

**seafood business** means a business, enterprise or activity that involves the primary production of seafood intended for sale.

**seafood handler** means a person who engages in or supervises the primary production of seafood, for a seafood business.

**seafood premises** means any premises including land, vehicles, parts of structures, tents, stalls and other temporary structures, vessels, pontoons, and any other place declared by the relevant authority to be a premises under the Food Act, kept or used for the primary production of seafood (exclusively or otherwise), regardless of whether the premises are owned by the proprietor, including premises used principally as a private dwelling.

**temperature control** means maintaining seafood at a temperature of -

- (a) 5°C, or below if this is necessary to minimise the growth of infectious or toxigenic micro-organisms in the food so that the microbiological safety of the food will not be adversely affected for the time the food is at that temperature; or
- (b) another temperature — if the food business demonstrates that maintenance of the food at this temperature for the period of time for which it will be so maintained, will not adversely affect the microbiological safety of the food.

## **Division 2 – Seafood safety requirements**

### **3 General seafood safety management**

A seafood business must systematically examine all of its primary production and processing operations to identify potential seafood safety hazards and implement controls that are commensurate with the food safety risk.

#### **Editorial note:**

The ‘controls’ referred to in this clause should include –

- a. Measures to control hazards from air, soil, water, bait and feedstuffs, fertilizers (including natural fertilizers), pesticides, veterinary drugs and any other agent used in primary production of seafood; and
- b. Controls to protect food sources from faecal and other contamination.

### **4 Contamination and handling**

(1) A seafood business must take all necessary steps to prevent the likelihood of seafood being or becoming contaminated.

(2) A seafood business must take all reasonable measures to ensure that seafood handlers handle seafood or surfaces likely to come into contact with seafood in a way that is not likely to compromise the safety or suitability of seafood.

### **5 Inputs and harvesting areas**

(1) A seafood business must take all reasonable measures to ensure inputs do not adversely affect the safety or suitability of the seafood.

(2) A seafood business must not harvest seafood in an area if it is known, or ought reasonably be known at the time, that the seafood, if harvested in the area, may not be safe or suitable when sold for human consumption.

### **6 Seafood storage**

(1) A seafood business must, when storing seafood, other than live seafood, store the seafood under temperature control and have a means of monitoring the temperature of the seafood.

(2) A seafood business must, when storing live seafood, store the seafood in such a way that the conditions under which it is stored will not adversely affect the safety or suitability of the seafood.

### **7 Seafood transportation**

(1) A seafood business must, when transporting seafood, other than live seafood, transport the seafood under temperature control and have a means of monitoring the temperature of the seafood.

(2) A seafood business must when transporting live seafood, transport the seafood under conditions that will not adversely affect the safety or suitability of the seafood.

**Editorial note:**

For clauses 6 and 7 -

The term 'temperature control' is defined in clause 2 of this Standard.

**8 Seafood packaging**

A seafood business must, when packaging seafood –

- (a) only use packaging material that is fit for its intended use; and
- (b) only use packaging material that is not likely to cause contamination of the seafood; and
- (c) take all reasonable measures to ensure that the seafood does not become contaminated.

**9 Seafood for disposal**

(1) A seafood business must ensure that seafood for disposal is held and kept separate until it is –

- (a) destroyed or otherwise used or disposed of so that it cannot be used for human consumption; or
- (b) returned to its supplier; or
- (c) processed in a way that ensures its safety or suitability; or
- (d) ascertained to be safe and suitable for sale.

(2) A seafood business must clearly identify any seafood that is held and kept separate in accordance with subclause (1) as returned seafood, recalled seafood, or seafood that is or may not be safe and suitable.

**Editorial note:**

'Seafood for disposal' has the same meaning as 'food for disposal' as defined in Standard 3.2.2, clause 11 – that is – the seafood is subject to a recall, or has been returned, or is not safe or suitable, or is reasonably suspected of not being safe or suitable.

**10 Seafood receipt**

(1) A seafood business must take all reasonable measures to ensure it only accepts seafood that is protected from the likelihood of contamination.

(2) A seafood business must, when receiving seafood, other than live seafood, take all reasonable measures to ensure it only accepts seafood that is under temperature control.

(3) A seafood business must, when receiving live seafood, take all reasonable measures to ensure that it receives seafood that has been transported in such a way that has not or will not adversely affect the safety or suitability of the seafood.

## **11 Seafood tracing**

A seafood business must maintain sufficient written records to identify the immediate supplier and immediate recipient of seafood for the purposes of ensuring the safety of the seafood.

## **12 Skills and knowledge**

A seafood business must ensure that seafood handlers have –

- (a) skills in food safety and food hygiene; and
- (b) knowledge of food safety and food hygiene matters;

commensurate with their work and the food safety risks.

## **13 Health and hygiene requirements**

(1) A seafood handler must exercise personal hygiene and health practices that are commensurate with the food safety risks and that do not adversely affect the safety or suitability of the seafood.

(2) A seafood handler who –

- (a) has a symptom that indicates the handler may be suffering from a food-borne disease; or
- (b) knows he or she is suffering from a food-borne disease; or
- (c) is a carrier of a food-borne disease;

must not engage in any handling of seafood where there is a reasonable likelihood of seafood contamination as a result of the disease.

(3) A seafood business must take all reasonable measures to ensure that seafood handlers exercise personal hygiene and health practices that are commensurate with the food safety risks and that do not adversely affect the safety or suitability of the seafood.

## **14 Seafood premises and equipment**

(1) A seafood business must ensure that seafood premises, including live seafood premises, and equipment used in the primary production of seafood are –

- (a) so far as is reasonably necessary, kept clean; and
- (b) designed, constructed, maintained and operated;

such that the safety or suitability of the seafood will not be adversely affected.

(2) For the purposes of subclause (1), a seafood business must comply with –

- (a) Division 5 of Standard 3.2.2 and Standard 3.2.3 of this Code; or
- (b) a set of requirements recognised by the Authority.

### **Editorial note:**

Where the cleaning of equipment such as fishing nets and oyster racks would not affect the safety or suitability of the seafood, the cleaning of this equipment will not be necessary to meet the requirements in paragraph 14(a).

## Division 3 – Specific requirements for bivalve molluscs

### 15 Interpretation

In this Division –

**approved** means approved by the Authority.

**area** means an area where bivalve molluscs are grown or harvested.

**ASQAP Manual** means the Australian Shellfish Quality Assurance Program Operations Manual - Version 3 of 2002.

**Authority** means the State, Territory or Commonwealth government agency or agencies having the legal authority to implement and enforce this Division.

**batch** means a quantity of bivalve molluscs which is harvested, depurated or handled from the same lease number and with the same harvest date.

**bivalve molluscs** include cockles, clams, mussels, oysters, pipis and scallops intended for human consumption, but excludes scallops and pearl oysters, where the only part of the product consumed is the adductor muscle, and spat.

**growing on** means the process where juvenile bivalve molluscs are translocated to a classified area for a sufficient period to enable their development prior to sale.

**relaying** means the transfer of bivalve molluscs from one area to another for the reduction of contaminants in the bivalve molluscs.

**spat** means juvenile bivalve molluscs taken for the sole purpose of growing on.

**Editorial note:**

If spat are harvested for human consumption then the product falls within the definition of ‘bivalve mollusc’. In that case, the requirements in this Division for bivalve molluscs apply to the product.

**wet storage** means the temporary storage of bivalve molluscs from an area in containers or tanks containing natural or artificial seawater for purposes other than depuration.

### 16 Food safety management systems for bivalve molluscs

(1) A seafood business that engages in the primary production or processing of, or manufacturing activities concerning, bivalve molluscs must implement a documented food safety management system that effectively controls the hazards.

**Editorial note:**

‘Hazard’ is defined in Standard 3.1.1 as a biological, chemical or physical agent in, or condition of, food that has the potential to cause an adverse health effect in humans.

Under subclause 1(2) of this Standard, the requirement for a food safety management system in subclause 16(1) does not apply to retail sale activities concerning bivalve molluscs.

- (2) A seafood business is taken to comply with subclause (1) if it implements –
  - (a) a food safety program set out in Standard 3.2.1; or
  - (b) a food safety management system set out in the Commonwealth Export Control (Processed Food) Orders; or
  - (c) the Codex Alimentarius Hazard Analysis and Critical Control Point System (HACCP) for food safety management set out in Annex C to CAC/RCP 1-1969, revision 4 (2003); or
  - (d) any other Hazard Analysis and Critical Control Point (HACCP) based food safety management system recognised by the Authority.
  
- (3) For the purposes of subclause (1), a seafood business must comply with –
  - (a) the conditions of the ASQAP Manual specified in the Schedule to this Standard; or
  - (b) conditions recognised by the Authority.

**Editorial note:**

The ASQAP Manual is the National guideline for managing risks in the harvesting, relaying, depuration and wet storage of shellfish.

Subclause 16(3) does not require producers or processors of bivalve molluscs to classify or close harvesting areas. Under the ASQAP Manual the classification of these areas is the responsibility of the State Shellfish Control Agency (SSCA).

The Australian Shellfish Quality Assurance Advisory Committee (ASQAAC) maintains the ASQAP Manual.

‘HACCP’ has a technical meaning commonly understood by the food production and manufacturing industry.

## **17 Co-mingling of bivalve molluscs**

A seafood business must ensure that each batch of bivalve molluscs harvested must be separated in a manner that prevents co-mingling of batches.



**SCHEDULE  
ASQAP MANUAL CONDITIONS**

Column 1 - Activities	Column 2 - Conditions
<p><b>Activity 1</b> Harvesting</p>	<p>The area -</p> <ul style="list-style-type: none"> <li>(a) has been classified by the Authority as –               <ul style="list-style-type: none"> <li>(i) approved; or</li> <li>(ii) conditionally approved; or</li> <li>(iii) approved as remote; or</li> <li>(iv) offshore; and</li> </ul> </li> <li>(b) is subject to a Marine Bio-toxin Management Plan; and</li> <li>(c) has an open status; or</li> <li>(d) is undergoing classification and is approved by the Authority subject to conditions, if any, specified by the Authority.</li> </ul>
<p><b>Activity 2</b> Harvesting for depuration or relaying</p>	<p>The area -</p> <ul style="list-style-type: none"> <li>(a) has been classified by the Authority as –               <ul style="list-style-type: none"> <li>(i) approved; or</li> <li>(ii) conditionally approved; or</li> <li>(iii) approved as remote; or</li> <li>(iv) restricted; or</li> <li>(v) conditionally restricted; and</li> </ul> </li> <li>(b) is subject to a Marine Bio-toxin Management Plan; and</li> <li>(c) has an open status for the purposes of depuration or relaying; or</li> <li>(d) is undergoing classification and is approved by the Authority, subject to conditions, if any, specified by the Authority.</li> </ul>
<p><b>Activity 3</b> Post harvest temporary wet storage</p>	<p>The water used must be -</p> <ul style="list-style-type: none"> <li>(a) sourced from an area that satisfies the conditions for Activity 1 (other than Condition (d)); or</li> <li>(b) of a quality that will not adversely affect the safety and suitability of the bivalve molluscs;</li> </ul> <p>and</p> <ul style="list-style-type: none"> <li>(c) effectively disinfected or maintained during the course of the wet storage in such a way that it continues to satisfy the conditions for Activity 1 (other than Condition (d)).</li> </ul>