

October 2018

# Strawberry tampering incident

Report to government

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## Executive summary

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Food safety is of fundamental importance to Australia and confidence in the food that people consume is crucial. Food safety incidents such as the one discussed in this report can result in public health and safety risks as well as widespread consumer concern and large negative impacts to the Australian food industry including significant costs due to recalls and disruption to business. Such incidents can also negatively impact the trust and reputation of Australian products in international trade.

This report on the tampering of Australian strawberries in September 2018 has been produced by Food Standards Australia New Zealand (FSANZ) in response to a request by the Minister for Health the Hon Greg Hunt MP. This request was '*...to investigate whether there are supply chain weaknesses, whether there are actions we can take to assist the police, whether there are systemic changes which are required*'.

In completing this report, FSANZ consulted with government and industry stakeholders.

The report summarises:

- measures taken by food regulatory agencies, the police and industry in response to the incident
- issues identified by food regulatory agencies, police and industry stakeholders about supply chain vulnerabilities, response procedures and communications
- recommendations arising from these meetings to improve current arrangements.

The report also provides general background information on Australia's national incident response framework, strawberry production and related industry bodies in Australia.

While governments' response to this food incident was timely in protecting public health, government and industry stakeholders have identified several key areas for improvement. These include centralising incident coordination functions to encompass all relevant government agencies including police, and improving the consistency and messaging of incident communication. The investigation revealed a complex supply chain and strengthened traceability measures and contingency planning in the strawberry industry (and other high-risk horticulture) are needed. Mitigation strategies to protect food against intentional contamination need to be informed by a vulnerability assessment which includes the severity and scale of the potential impact plus the degree of access to the product at different stages of the supply chain.

The following recommendations are made:

1. All jurisdictions should review their food incident response protocols - in particular ensuring that formal linkages between regulators, health departments and police are in place for incidents involving intentional contamination.
2. When a food tampering incident occurs across jurisdictions, a central agency should be engaged to ensure national coordination of messaging and information associated with the incident.
3. Police should be included in national food incident debriefs when intentional food tampering is involved.

4. Triggers for activation and management of intentional contamination of food under the National Food Incident Response Protocol (NFIRP) should be reviewed by the food regulatory system.
5. A representative body for the horticulture industry is required to support crisis preparedness and response in the sector.
6. Traceability measures within the horticulture sector need to be strengthened. Government and industry should work together to map the current state of play and identify options and tools for enhancing traceability.
7. Work on traceability should include collaboration with research bodies and other stakeholders to evaluate technical and innovative solutions to improve quality assurance throughout the supply chain.

FSANZ will convene a joint debrief (industry/jurisdictions/police) of the strawberry tampering incident in the first half of 2019 to further reflect on the incident and confirm what systemic changes may be required. This will link in with current work being carried out by FSANZ and jurisdictions on the national food regulation system. Feedback on this debrief will be provided to Government.

## Introduction

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In September 2018, a food tampering incident occurred involving sewing needles inserted into Australian strawberries. Initially an isolated event in Queensland, the incident escalated to other states and territories involving multiple tampering events in strawberries and other fruit across the country. Only a few instances were believed by authorities to be associated with the original event with most other instances believed to be multiple hoax or 'copycat' events.

Queensland Health and the Queensland Police Service (QPS) have led the incident investigation and response. State and territory food regulatory agencies and the Australian Government have also responded with a range of measures including removing implicated strawberries from sale, introducing and strengthening penalties for food tampering, and imposing stricter conditions for strawberry export. Industry funding support is also being provided. Investigations and response actions are continuing as at the time of this report.

## Background

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### Food incidents

Food incidents can result in public health and safety risks as well as widespread consumer concern and significant disruption to domestic and international trade.

'Food incident' means any situation within the food supply chain where there is a risk or potential risk of illness or confirmed illness or injury associated with the consumption of a food or foods. Foodborne hazards causing illness or injury may be microbiological, chemical, radiological, physical or unknown. A food incident can also relate to a food issue that could, or is expected to, affect multiple government jurisdictions.

A food incident can occur at any stage of the food supply chain, including during the primary production stage that has the potential to, or can be perceived to affect the safety of the end

food product. An incident may be identified from various sources; for example food recalls, a multi-jurisdictional outbreak investigation or intelligence from industry, local/state government or international counterparts.

Recent food incidents in Australia include the national increase in listeriosis cases linked to rockmelons, and Hepatitis A virus infection linked to frozen pomegranate arils, both of which occurred in 2018. Other earlier examples include Hepatitis A virus in frozen berries (2015 & 2017), salmonellosis linked to rockmelons (2016), and undeclared milk allergens in coconut milk products (2015). Further information on food incidents is available on the FSANZ website (<http://www.foodstandards.gov.au/industry/FoodIncidents/Pages/default.aspx>).

Intentional food contamination events are rare in Australia. However, there have been several instances in the past, including a sewing needle and razor blade found in packaged cakes and rat poison found in self-service salad bars (both in 2006).

## Australia's food incident response framework

Australia's food regulatory system has a framework in place to respond to an incident in a timely and coordinated manner. This framework enables governments to work closely together and engage with industry to protect public health and minimise the impact of the incident on consumers and trading partners.

When multiple government jurisdictions are affected by a food incident it is considered a national (or bi-national) incident, and response action is needed at a national level. Each regulatory agency determines what needs to be done in their jurisdiction and responds according to their food law, response plans and protocols. Nationally consistent responses are achieved by working together through established networks and procedures. These include the government's Bi-national Food Safety Network and/or the National Food Incident Response Protocol, and the joint government-industry's Food Incident Forum. Further details are on these networks and procedures are provided below.

### Bi-national Food Safety Network (BFSN)

The BFSN enables national (or bi-national, if appropriate) information sharing and coordination of responses to food incidents. This network is made up of FSANZ, the Department of Health, the Department of Agriculture and Water Resources and the food regulatory agencies of all Australian states and territories and New Zealand. It provides an overarching framework for all these agencies to routinely share and assess information on food issues and determine subsequent actions, as appropriate. The BFSN provides an effective mechanism for both early and continued engagement on food incidents including discussions by bi-/national teleconferences when required. FSANZ provides the central coordinating point and secretariat.

### National Food Incident Response Protocol (NFIRP)

The NFIRP is a protocol endorsed by ministers responsible for food regulation that outlines an agreed incident response process to be followed by all Australian food regulatory agencies and FSANZ. An agency in any jurisdiction with legislative responsibility for food safety (but not FSANZ) may choose at any time to activate the NFIRP, but there is no obligation to do so. The protocol usually operates through the BFSN although other networks and expert groups may be involved (e.g. Communicable Disease Network Australia).

The NFIRP provides a graduated response for smooth escalation and de-escalation of activities and agency involvement depending on the nature and seriousness of the issue. It

includes guidance on roles and responsibilities, consultation with industry and consensus on communication strategies. It also includes an annex on intentional interference of food.

The NFIRP only covers response by food regulatory agencies. Other actions during a national food incident may be enacted under relevant health, quarantine, agriculture, trade practices, consumer or environmental legislation<sup>1</sup>.

Due to the unique criminal nature of this case and associated investigation, the protocol was not triggered.

## **Role of FSANZ**

FSANZ is a statutory authority in the Australian Government Health portfolio. Its functions are set out under the *Food Standards Australia New Zealand Act 1991* (the FSANZ Act). FSANZ's core function is to develop and administer food standards for Australia and New Zealand, encompassed in the Australia New Zealand Food Standards Code. FSANZ is not a regulatory authority and as such does not enforce the Code. In Australia, food standards are enforced by the states and territories (usually their health or primary industries departments) or, in some cases, by local government.

Other key FSANZ functions are to coordinate food responses (including responses to food recalls and incidents) and food surveillance activities. FSANZ also conducts research and provides risk assessment advice for imported foods to the Department of Agriculture and Water Resources.

If a food incident occurs, FSANZ's primary role in the BFSN and under the NFIRP (if activated) is to coordinate activities, collate and share information between the food regulatory agencies and, in many cases, develop public statements. If a food recall is required, FSANZ coordinates the recall with the relevant food regulatory agency and affected business/es. The NFIRP gives FSANZ several additional coordination roles, including National Food Incident Coordinator and Communications Controller.

The illustration below shows the key roles of FSANZ and other government agencies.

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<sup>1</sup>In the case of a terrorism event involving food, protocols under Australia's national security and counter terrorism arrangements would be activated. Emergency Management Australia (EMA) is the Australian Government lead for disaster and emergency management.



## Food Incident Forum

The Food Incident Forum was established as a government-industry forum in 2016 to facilitate discussion on food issues and incidents. It is made up of Australian food industry groups, sectors and businesses as well as Australian government food agencies and New Zealand's Ministry for Primary Industries. Its purpose is to share information and collaborate on potential food safety issues and actual food incidents including on preparedness, response and recovery. The extent of members' involvement depends on the specific issue. While information sharing is a key purpose, it is acknowledged that there may be constraints on what information government and industry can share.

It is vital that government and food businesses work together during a food incident. Through the Food Incident Forum, FSANZ (as secretariat) can quickly notify key industry representatives, including retailers, if there is a food incident. Proactive information sharing can help with traceback and improve response actions.

## A note on intentional interference

Intentional interference or food tampering incidents are different to other food incidents because a person who carries out such an act commits a crime and can be charged by the police. In these instances the police have statutory responsibility and are generally the lead agency. Strict confidentiality is often required to avoid jeopardising the investigation and triggering copycat behaviour.

The management and investigation of an intentional interference incident will differ from case-to-case depending on variables such as risk, legislative requirements and police interaction/requests. The decision on appropriate response actions will need to be made on a case-by-case basis in conjunction with the police. Food regulatory agencies in each jurisdiction have arrangements in place to work with police and coordinate response actions.

## Industry preparedness

Food businesses may have various mechanisms in place for quality assurance and food safety (e.g. Hazard Analysis Critical Control Point (or 'HACCP') plans, industry standards). Regardless, ultimately the system cannot be completely failsafe. Even with the best laid mitigation plans, incidents such as intentional tampering can still occur.

Mechanisms to prevent food incidents are critically important to have in place. However, once an incident actually occurs the emphasis shifts to responding in the best way to protect public health and, where possible, also protect the industry (e.g. by use of appropriate public messaging). This response needs to be collaborative, consistent and place public safety first.

Currently the horticulture industry has no single representative body—there are a multitude of smaller bodies representing growers to various extents (see Appendix 2). There are also various programs and guidelines that may provide useful resources to help growers mitigate against food safety risks and manage food incidents (e.g. Freshcare, see Appendix 3). However, uptake of these mechanisms is voluntary and not systemic in the industry.

## Australia's strawberry industry

Australian strawberries are grown all year round by about 260 growers across six states, predominantly in Queensland and Victoria. Most produce is eaten as fresh fruit by Australian consumers. In the 2016–2017 financial year strawberry production in Australia was valued at \$560 million and made up approximately 1% of all Australian horticultural production (Hort Innovation 2018). Further information on production and supply is in Appendix 1.

The industry is fairly fragmented with many small businesses and little regulatory or industry oversight.

## The incident timeline and response

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The incident began on 9 September when Queensland Health received notification of a single tampering event, where a sewing needle was found by a consumer eating a fresh strawberry. The events that followed are outlined below and in the accompanying figure, including media and key actions taken by governments and industry.

### Queensland response

The Queensland government introduced new provisions into their Food Act relating to suspected intentional contamination of food in June 2006<sup>1</sup>. The provisions require food businesses to notify Queensland Health if they have a reasonable suspicion that food tampering has occurred on their premises. Clear protocols for investigating tampering incidents were established, including an industry protocol<sup>2</sup>.

Queensland Health is the lead agency in the investigation of suspected intentional contamination of food (and involves other departments and agencies such as local government as needed). The Queensland Police Service (QPS) has the lead role in conducting the criminal investigation when it has been determined that the contamination is intentional.

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<sup>1</sup> Queensland introduced new food tampering laws following two high profile food tampering incidents occurring there in 2006. One of these involved Sizzler restaurants when rat poison was found in food from the self-service salad bars at two Brisbane restaurant. The other involved Top Taste bakery in Kedron, Brisbane, when foreign objects, including a sewing needle and razor blade, were found in cakes in Queensland, Victoria and Tasmania.

<sup>2</sup> *Suspected intentional contamination of food - Industry Protocol*, see <https://publications.qld.gov.au/dataset/food-act-compliance-information-for-businesses/resource/ed8933d3-5439-461e-afe6-fb17111161c8>

Once a deliberate food tampering incident had been established for strawberries produced in Queensland and a brand confirmed (Wednesday 12 September), the incident was escalated to the QPS Organised Crime Investigation Unit. Queensland Health and QPS jointly named the brands (Berry Obsession and Berry Licious) to media to protect public health.

On Friday 14 September, a further brand of strawberries was implicated (Donnybrook Berries) and the State Health Emergency Coordination Centre was activated to coordinate communication across government and with industry. Queensland Health communicated with other regulatory agencies through the BFSN and the network continued to share information and coordinate communication and other activities from that point.

By the end of September, more than 200 notifications of food tampering incidents had been made nationally. The only credible linked cases were associated with Berry Licious, Berry Obsession and Donnybrook Berries. These three brands were removed from sale.

Queensland Health and QPS investigations are continuing as at the date of this report.

### STRAWBERRY INCIDENT TIMELINE

SEPTEMBER



**ENFORCEMENT AGENCY MEDIA**

Initial complaint received by Qld Health after hours officer	Initial investigations by EHOs	Joint Qld Police Qld Health video media conference			Qld Health lead agency; media release audio	SA Police media release		NSW Police media video	DAWR media statement		NZ retailer issue media
		<b>2 brands</b> Qld sourced			<b>1 further brand</b> Qld sourced	<b>1 further brand</b> WA sourced		<b>3 confirmed brands</b> Qld sourced mentioned plus other fruits			<b>1 further brand</b> WA sourced
	Formal investigation underway				NSW Police/ NSW Health media					Updated NSW government media release issued	
					<b>3 additional brands</b> not withdrawn or recalled					removing the 3 additional brands	

**BI-NATIONAL FOOD SAFETY NETWORK**

Qld media shared	1st teleconf.	AHPPC teleconf.	Qld media shared	SA media shared	2nd teleconf.		3rd teleconf.	4th teleconf.		5th teleconf.	
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**INDUSTRY**

Withdrawal: Berry Obsession Berry Licious			Precautionary temporary removal of other brands in some retailers	Trade level recall: Donnybrook	PMA ANZ host industry teleconference						
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**DAWR**

							DAWR teleconference	Enhanced export condition introduced media statement			
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**FSANZ**

				FSANZ tasked to investigate							Government roundtable
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OCTOBER

	<b>5</b>	<b>9</b>	<b>31</b>
	FSANZ met with Qld Police and Qld Health EHOs	Industry & Retailer roundtable	Final report to be provided to government

EHO - Environmental Health Officer  
 DAWR - Department of Agriculture and Water Resources  
 AHPPC - Australian Health Protection Principal Committee  
 PMA ANZ - Produce Marketing Association Australia New Zealand  
 FSANZ - Food Standards Australia New Zealand

## Australian Government actions

Australian Government actions during the incident included:

- At the request of Queensland Health, FSANZ coordinated communications between food regulatory agencies through the BFSN and also coordinated the trade-level recall of Donnybrook Berries. The NFIRP was not activated for this incident.
- The Department of Agriculture and Water Resources introduced interim measures<sup>1</sup> from 19 September requiring exporters to provide evidence that strawberry consignments are free from metal contamination (e.g. evidence of screening by metal detectors/ x-ray at end point or on farm).
- The Australian Government passed new and strengthened laws against food tampering through the Criminal Code Amendment (Food Contamination) Bill 2018. The laws increase the maximum penalty for food tampering from 10 years to 15 years under existing laws, and introduce a new offence where a person contaminates goods, threatens to contaminate goods or makes false statements about the contamination of goods and is reckless about the causing of public alarm or anxiety. Existing Commonwealth sabotage offences were changed to cover food supply infrastructure.

## Government roundtable discussion

FSANZ convened a roundtable discussion with jurisdictional senior food and health officials in Brisbane on 27 September 2018. Attendees included representatives from:

- ACT Health
- Department of Agriculture and Water Resources
- Department of Health (Food Policy, Australian Health Protection Principal Committee)
- New South Wales Department of Primary Industries (NSW Food Authority)
- Northern Territory Department of Health
- Primary Industries and Regions South Australia (PIRSA)
- Queensland Health
- Queensland Department of Agriculture and Fisheries
- SafeFood Production Queensland
- South Australian Department of Health and Ageing
- Tasmanian Department of Health and Human Services
- Victorian Department of Health and Human Services
- Western Australia Department of Health
- New Zealand Ministry for Primary Industries (MPI).

The meeting enabled all agencies to provide feedback on the incident response, including the effectiveness of response procedures. All state and territory jurisdictions reported they had experienced ongoing product tampering incidents, resulting in food enforcement agencies and police working together. This highlighted a need for a better understanding of process when a police investigation is involved, particularly when communicating to the

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<sup>1</sup> Advisory notice issued <http://www.agriculture.gov.au/export/controlled-goods/plants-plant-products/ian/2018/2018-41>

public. It was unclear as to the criteria used by the police for determining what information to share—the naming of additional strawberry brands by police media in two states, for example, complicated the response early on and affected the industry in other states. Attendees noted that Operational arrangements that work across jurisdictions are required to ensure consistent messaging nationally—and this will require a review of current protocols.

Three complaints involving exported Australian strawberries were reported and investigated in New Zealand. New Zealand MPI have good operational arrangements with police in place following an incident in 2014 when a threat to contaminate infant formula with 1080 poison was made. New Zealand MPI and police aligned public messages, most enquires were directed to MPI.

## Supply chain vulnerabilities

The government discussion on supply chain vulnerabilities identified traceability along the supply chain as a key issue. It also raised that the fragmented nature of the sector, with many small businesses and no regulatory or industry oversight (no peak body representation) meant food safety expertise in the industry is variable.

### Traceability

Traceability in the horticulture sector is compounded by a lack of regulatory requirements for business notification/registration. Locating farms is an issue without a system that can identify the existence of a farm business, its location and the nature of its operation. Appropriate regulation of the horticulture sector, including notification requirements, is required<sup>1</sup>.

Other factors impacting effective traceability include:

- co-mingling of produce (produce from more than one farm/supplier is combined)
- complexity of the supply chain (produce may go from farm to three distributors and then further—this means getting distribution lists can be very challenging and may involve hundreds of pages of paperwork)
- packaging—either produce is not packaged or, where packaging is used (such as with strawberry punnets), there may be co-mingling from more than one farm or packaging may be re-used/ sold-on from another business.

Traceability along the supply chain needs to be better understood and measures identified to enhance supply chain integrity. The customary ‘one step forward, one step back’ approach to traceability may not be adequate.<sup>2</sup>

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<sup>1</sup> Following Forum8, the Minister for Rural Health, Senator the Hon Bridget McKenzie, requested FSANZ to identify appropriate regulatory and non-regulatory measures for Australia to manage food safety risks in five high risk horticulture sectors: ready to eat, minimally processed fruits and vegetables; fresh leafy green vegetables; melons; berries and sprouts. FSANZ’s work on high risk horticulture will provide a national process for developing appropriate regulation of the horticulture sector.

<sup>2</sup> Food traceability (FSANZ website:  
<http://www.foodstandards.gov.au/industry/safetystandards/traceability/Pages/default.aspx>)

## Risk assessment and mitigation

Discussion about whether risk assessment is required and what kind of risk assessment is appropriate to fully understand supply chain vulnerabilities highlighted the following points:

- there is an opportunity to look more broadly and take a scalable, all hazards approach
- joint (industry and government) ownership—co-ownership on assessing and managing risk provides co-benefit (market reputation and public health).
- risk mitigation measures must be proportionate and sustainable.

The nature of the strawberry tampering incident resulted in a focus on the use of metal detectors as an essential risk mitigation measure. Concerns were raised about practicality, efficacy and cost including:

- pressure placed on growers to have metal detectors on farm, but if produce is vulnerable to tampering further down the chain will this be effective?
- the minimum cost of metal detectors that are appropriate (and work) is \$20,000–\$30,000
- a validation process is required, taking into account the particular food (size, shape and orientation) and how a metal contaminant may be positioned.

Background information on metal detectors in the food industry is provided in Appendix 4.

Tamper proof packaging was also considered problematic due to its potential to accelerate deterioration of product quality and limit shelf life.

## Food safety culture in industry

Industry expertise, particularly food safety knowledge and its application to production practices, varies. Factors contributing to this variation include the nature of the workforce (i.e. seasonal, using contract pickers that work across multiple farms and commodities) and a culture of being a farmer rather than food producer. There is an opportunity for industry and government to work together to enhance food safety culture for the sector.

## Communication and coordination arrangements

The importance of early and consistent messaging (by police and health agencies) was identified by all government representatives as fundamental to public communication during food incidents. Queensland Health noted *it is vital that it is clear who is leading communication and careful management of messaging with an acknowledgement that communication out of step can be damaging not only to the industry but to investigations by both food regulators and police.*

While jurisdictions have their own arrangements in place for notifying food tampering incidents to police for investigation at the local level, when an incident becomes national a single, national point of communication is required. Particular points raised in the discussion included:

- coordination arrangements between police, health and food agencies across jurisdictions should be understood

- existing protocols (e.g. National Food Incident Response Protocol, investigation protocols between food agencies and police) may need to be reviewed to better reflect the interface between health, food, agriculture, police and industry, and reflect contemporary arrangements
- communications and information to the public/ media could be facilitated by having a single national website (similar to the US Centers for Disease Control and Prevention website which provides real-time information to the public on outbreaks and incidents)
- the effect of social media, particularly for instigating copycat incidents, was a particular challenge and communication protocols should be reviewed to include a social media strategy
- police should be involved in the debrief of this incident (which will be held under the Bi National Food Safety Network) and a process for a government/industry incident debrief should also be considered
- international engagement and communication also needs to be considered, noting export markets and potential trade impacts.

## Product recall

There was some discussion about the terminology relating to product recall and the confusion that can be created for the public and regulatory agencies when incorrect or inconsistent wording is used. For example, initial media from Queensland Health referred to Berry Obsession and Berry Licious brand strawberries being ‘recalled’<sup>1</sup> rather than ‘removed from sale’. Donnybrook brand strawberries were recalled, but only at trade level (since consumers were already informed through the media). The need for better education/information on food recalls and the terminology and processes involved was highlighted.

## Queensland government

A separate meeting was held with Queensland government environmental health officers (EHOs) involved in on-farm investigations. The officers provided a thorough overview of strawberry production and their inspections of facilities located in south east Queensland. They noted the good cooperation between industry and various Queensland government authorities (police, agriculture and food regulators, EHOs) during the investigations.

EHOs noted the value of having:

- developed relationships between food regulatory and law enforcement authorities, and having known contacts built up and practised outside of a crisis
- a formal written protocol in place with industry

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<sup>1</sup> **Food recall** is a defined action coordinated by FSANZ. There are two levels of food recall: consumer and trade. Consumer-level recalls are communicated publically, including publishing on the FSANZ website. Trade-level recalls are not notified to the public.

- key people physically located together—including the State Health Emergency Coordination Centre centrally locating multiple government officers (liaison officers from across all sectors, police, health, agriculture, community and support services), and earlier on, locating a Queensland Health EHO within the QPS command centre

The EHOs reiterated that multiple lessons can be learnt from this incident; particularly around the timing of communications and media, and cross-agency coordination. A joint debrief with police and food regulatory agencies was considered useful.

## Industry roundtable discussion

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On 9 October 2018 FSANZ held a meeting in Brisbane with industry representatives from:

- Brisbane Markets
- Freshcare
- Fresh Produce Group
- Fruit Growers Tasmania
- Growcom
- Produce Marketing Association Australia-New Zealand
- Queensland Strawberries
- SA Produce Markets
- WA Markets
- retailers (Aldi, Coles, Costco, David Jones, Harris Farm, Metcash, Woolworths).

The meeting provided an opportunity to review the incident and more broadly discuss supply chain vulnerabilities and the effectiveness of emergency response procedures including communications. While the comments, summarised below, are based largely on the specifics of the strawberry tampering incident, the observations/recommendations made apply across the horticulture sector and to any food safety incident.

## Supply chain vulnerabilities

Deliberate product tampering can occur at any stage in the supply chain. Several factors were identified as supply chain vulnerabilities for the strawberry industry, and fresh produce sector generally:

- there are many touch points (from field to pack house, transport, retail and consumer)
- the seasonal nature of work and labour hiring practices leads to difficulties in monitoring workers
- co-mingling of product from more than one farm.

At the time of the incident there was considerable coverage that focussed on preventing/mitigating further product tampering, specifically for needle contamination. The need for metal detectors was amplified through the media. The reality is that deliberate product tampering may involve other physical contaminants, including glass and plastic, or may be chemical or biological.

Discussion about tamper proof packaging raised the following challenges for fresh produce:

- the nature of fresh produce such as strawberries requires breather holes in packaging to prevent fungal and bacterial growth, otherwise there is a rapid deterioration in product quality and reduction in shelf life
- there is increasing scrutiny over the use of plastic packaging in the food industry, the community wanting less packaging for environmental reasons.

Most retailers were impacted by prolonged copycat tampering incidents across all states and territories resulting from the media coverage. These incidents involved a range of fresh produce lines (including apples, bananas, mandarins, mangoes, raspberries) as well as other products such as bread and non-food items such as nappies.

While risk mitigation measures are being assessed by the industry based on this particular tampering incident, the need for better response and incident management processes for the horticulture sector was highlighted (discussed below under crisis management).

A discussion on the use of metal detectors elicited the following points:

- effective systems are expensive (\$20,000–\$50,000) and there are ongoing costs associated with maintenance and validation
- given the number of growers and packers, costs to the industry are amplified
- there is some question as to what point in the chain they could be most effective (metal detectors on farm would only cover the first part of the supply chain)
- the DAWR requirement for metal detectors for export markets raises whether other commodities will be included.

There were concerns about the flow-on effects of metal detector and similar requirements being built into quality assurance systems across all fresh produce and the economic impacts such requirements would have.

## Traceability

Good product traceability throughout the supply chain is central to the speed and scope of the response to food safety incidents. As also noted in the government discussions, there are, however, several factors challenging traceability and supply chain integrity in the fresh produce industry:

- the scale of production
- complexity of the supply chain
- the bulk of horticultural produce is unpackaged (while strawberries are packaged in punnets and branded, co-mingling can occur)
- aggregation of produce along the supply chain
- not all growers participate in quality assurance programs (that include traceability)
- producers may regularly grow and switch between different produce lines.

Traceback to individual farms can be a particular challenge. There is no formal register of growers in the horticulture sector and a large number of small-scale producers and growers that supply direct to market. As a result, a comprehensive knowledge of the supply chain is lacking for this sector. The need for mapping supply chains to identify the current state of traceability in the fresh produce industry was identified (the strawberry industry could be the start)<sup>1</sup>. It was also noted that there is a lack of knowledge within the sector as to how the food regulatory system operates.

Discussion about enhancing traceability in the fresh produce sector highlighted tools such as lot coding and block chain technology, noting that any technology should be as easy to apply as possible. Whatever the option/system used, it should complement other requirements in the sector, such as those in place for biosecurity purposes. An investigation and report on what is happening internationally would be useful.

## Crisis management

An assumption was made that industry has the capacity to respond in crises and that an industry body can be engaged from the outset. The reality for the strawberry industry is that there is no national body to respond to such incidents. The result was that an individual, the Queensland Strawberry Industry Development Officer, was inundated with calls, particularly from the media, with no capacity to deal with them. In this case, Growcom—the peak representative body for Queensland horticulture—stepped up to help coordinate communication. Queensland Strawberries employed a crisis communication expert to help the strawberry industry in Queensland.

The need for an incident management process and national body for horticulture was reiterated by several industry representatives. Attendees reported that there are currently multiple, poorly funded industry bodies, providing a fragmented approach and no national voice and that there should be a contact across industry groups.

A previous initiative, 'Fresh Produce Watch', funded by Horticultural Research and Development Corporation and Horticulture Australia Ltd., was intended to have a more proactive role in crisis preparedness and management and risk communication. It was disbanded more than 10 years ago because of funding constraints. While Horticulture Industry Crisis Guidelines were developed (see Appendix 3), their uptake was reliant on individual industry bodies and businesses adopting them.

Plant Health Australia was identified as a possible model for a national body for horticulture food safety crisis management and preparedness (further information on Plant Health Australia is provided in Appendix 2).

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<sup>1</sup> Australia's traceability systems are currently under review for all agricultural commodities, including food. A joint Australian, State and Territory Government Traceability Working Group is underway <http://www.agriculture.gov.au/market-access-trade/traceability-project>. A Stage 1 report on improving Australia's systems for tracing agricultural production and products was provided to senior officials in October 2018. This report includes a stocktake of existing traceability systems, including for horticulture, and options for improvement, a summary report is available at the following link: <http://www.agriculture.gov.au/SiteCollectionDocuments/market-access-trade/traceability-project/enhancing-aus-systems-tracing-ag-production-products.pdf>.

## Communication and messaging

The need for upfront, clear and consistent messaging for government and industry was a strong theme. Earlier notification and engagement with industry can facilitate this. For example, the initial messaging from Queensland Health at the first press conference<sup>1</sup> was for consumers to dispose of strawberries. Following industry engagement and input, messaging evolved that both protected the consumer and the industry: cut them up before eating/ don't cut them out and cut before you chomp.



The impact of naming brands that weren't part of the Queensland investigation was noted as very damaging to the industry. Specifically, NSW Police media statements following incidents being reported in that jurisdiction implicated a further three brands that weren't part of the tampering investigation. This placed pressure on retailers, from a customer perception perspective, to remove these named brands from sale. Processes and communication protocols that work across jurisdictions and include an industry spokesperson are needed.

The power and use of social media was acknowledged as having a significant impact in this incident, both negatively (potentially exacerbating ongoing tampering incidents) and positively (gathering consumer support for the strawberry industry). This further highlighted the need for media training and communication expertise in the horticulture sector.

## Discussions with police

FSANZ met with representatives of QPS in Brisbane on 5 October 2018. Consistent with the roundtable meetings, QPS identified issues with national coordination and communication. They noted the need for a better ad hoc national coordination approach to crisis management and communications, outside of sectors already well catered for (i.e. natural disasters, terrorism etc.). Given the impact of media (which changed the landscape of response), there is a need for everyone to better understand the pros and cons of different public messages, and both intended and unintended consequences of mainstream and social media.

The complexity in mapping the supply chain of strawberries was also noted, with variability from brand to brand, on farm investigations; identification was problematic. Measures are needed to increase consumer confidence in the fresh produce sector. The sector also needs

<sup>1</sup> The press conference is available at <https://www.facebook.com/QueenslandPolice/videos/1872715856147571/>

better preparedness measures to increase the resilience of individual industries during and after a crisis.

FSANZ also held a teleconference with New South Wales Police on 19 October 2018. NSW Police reiterated the need for improved preparedness and a nationally/ centrally coordinated approach to crisis management and communications for intentional tampering. The importance of identifying an incident leader/spokesperson, and the timing and consistency of communications were noted. Processes should return to business as usual sooner rather than later in an incident and using established procedures.

NSW Police noted at one point they received more notifications of tampering than any other jurisdiction, and as such felt the need to step up communication with the media. The scope and size of public response was not expected (e.g. copycat behaviour and community support through mainstream and social media). As the incident progressed, NSW Police recognised the importance of issuing messaging consistent with other states. They also noted initial consumer advice to 'throw away' strawberries (meaning potential evidence may be destroyed), and unsubstantiated comments in the media on motives and who may have been responsible for the incident were not helpful. A joint debrief with police and food regulatory agencies was considered useful.

The police have an ad hoc national network which was up and running quite quickly in this incident to co-ordinate a consistent approach. Each state and territory, as well as New Zealand, was involved with QPS having command and control of the police investigation.

## Conclusions and recommendations

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Australia has mature food incident response systems and processes. There is added complexity, however, when food tampering occurs and police are involved in a criminal investigation. Complex supply chains and the fragmented nature of the horticulture industry provide further challenges for this sector. Discussions with government agencies, police and industry identified the following key areas for improvement:

- Communication
  - clear and consistent messaging from the outset that both protects public health and supports the industry where possible
  - consideration of timing and other sensitivities of potentially criminal investigations
  - improved understanding of the consequences of using mainstream and social media
- Co-ordination
  - enhanced national coordination with protocols and procedures that better encompass health, food, law enforcement and industry
  - consider the role for a central/lead body
  - consider joint industry/ government/law enforcement exercises in 'peacetime' to develop relationships and processes

- Traceability
  - better understanding of supply chain complexities in the horticulture sector (strawberry industry a start)
  - consideration of measures to improve identification and location of businesses
  - risk assessment of the supply chain of the strawberry industry and high-risk fresh produce more broadly
- Industry preparedness and support
  - an overarching representative industry body for horticulture for crisis preparedness and response
  - promote incident management plans throughout the horticulture sector
  - evaluation of effectiveness of preventative mechanisms currently in place
  - branding /packaging procedures, security measures along the supply chain

The following recommendations are made:

1. All jurisdictions should review their food incident response protocols - in particular ensuring that formal linkages between regulators, health departments and police are in place for incidents involving intentional contamination.
2. When a food tampering incident occurs across jurisdictions, a central agency should be engaged to ensure national coordination of messaging and information associated with the incident.
3. Police should be included in national food incident debriefs when intentional food tampering is involved.
4. Triggers for activation and management of intentional contamination of food under the National Food Incident Response Protocol (NFIRP) should be reviewed by the food regulatory system.
5. A representative body for the horticulture industry is required to support crisis preparedness and response in the sector.
6. Traceability measures within the horticulture sector need to be strengthened. Government and industry should work together to map the current state of play and identify options and tools for enhancing traceability.
7. Work on traceability should include collaboration with research bodies and other stakeholders to evaluate technical and innovative solutions (including, for example digital track and trace technologies such as blockchain along with other technologies such as smart sensors and packaging) to improve quality assurance throughout the supply chain.

FSANZ will convene a joint debrief (industry/jurisdictions/police) of the strawberry tampering incident in the first half of 2019 to further reflect on the incident and confirm what systemic changes may be required. This will link in with current work being carried out by FSANZ and jurisdictions on the national food regulation system. A report on this debrief will be provided to Government.

## Abbreviations

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AHPPC	Australian Health Protection Principal Committee
BFSN	Bi-national Food Safety Network
EHO	Environmental Health Officer
FSANZ	Food Standards Australia New Zealand
NFIRP	National Food Incident Response Protocol
QPS	Queensland Police Service

## Appendix 1 – The Australian strawberry industry

### Key facts and figures<sup>1</sup>

- Fresh strawberries are grown in Australia all year round by approximately 260 growers.
- Australian strawberry production for the 2016–2017 financial year was 91,083 tonnes with a production value of \$506.5 million.
- Almost all fresh strawberries go into the domestic market.
- Around 2-5% of total strawberry production is exported. In the 2016–2017 financial year fresh strawberry exports totalled 3,881 tonnes worth \$32.6 million. The main destinations were the Singapore, United Arab Emirates, New Zealand and Thailand.
- Imports of fresh strawberries are negligible, although Australia does import significant amounts of processed strawberry products.
- Last year 72% of Australian households purchased fresh strawberries, with peak consumption during the summer months.

### Production areas

Strawberry production is concentrated in coastal regions, with Queensland and Victoria being the main producers. Key production areas are the Sunshine Coast area of Queensland, the Yarra Valley region in Victoria, and Wannaroo, Bullsbrook and Albany in Western Australia.

Production areas vary seasonally across six states (Queensland, Victoria, Western Australia, South Australia, Tasmania and New South Wales). In the Queensland and Western Australia most production occurs between June and October. Peak production in the southern states (primarily Victoria) occurs between October and May (see Table).

**Table 1:** Annual production of strawberries across Australia

State	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	% of total production 2016-17
Qld													41%
Vic													36%
WA													11%
SA													7%
Tas													4%
NSW													1%

1. Source: 2016/17 Australian Horticulture Statistics Handbook, Horticulture Innovation (2018)

## Through-chain production steps

Strawberries are a short-term fruiting crop with delicate fruit that require hand picking and hand packing to minimise damage, and prevent microbiological growth. They have a refrigerated shelf life of 10 to 12 days from picking. The main steps involved in the supply of fresh strawberries to consumers are outlined below and in the figure 1.

### *Cultivation*

The strawberry industry is dominated by field production methods, although protective cropping systems (e.g. plastic tunnels or glasshouses; which can extend seasonality) are also used. The short-term fruiting gives growers the choice to cultivate other crops intermittently with other short-term crops such as leafy greens/vegetables.

### *Harvest*

High volumes of pickers are required for a short-term period and are often itinerant workers / farm labour contractors. Strawberries are hand-picked and placed on field trays; sometimes they are packed directly into punnets as harvested.

### *Transport to packing sheds*

Trays of strawberries are transported to packing sheds by field tractor.

### *Packing shed*

Strawberries are carefully hand dried then packed into punnets. Punnets sizes are primarily 250g, but also include 350g, 500g and 1 kg punnets. Punnets are packed into boxes for refrigerated storage, transport and distribution.

Second and third grade fruit may be frozen and sold to food manufacturers/processors for use in products such as jams.

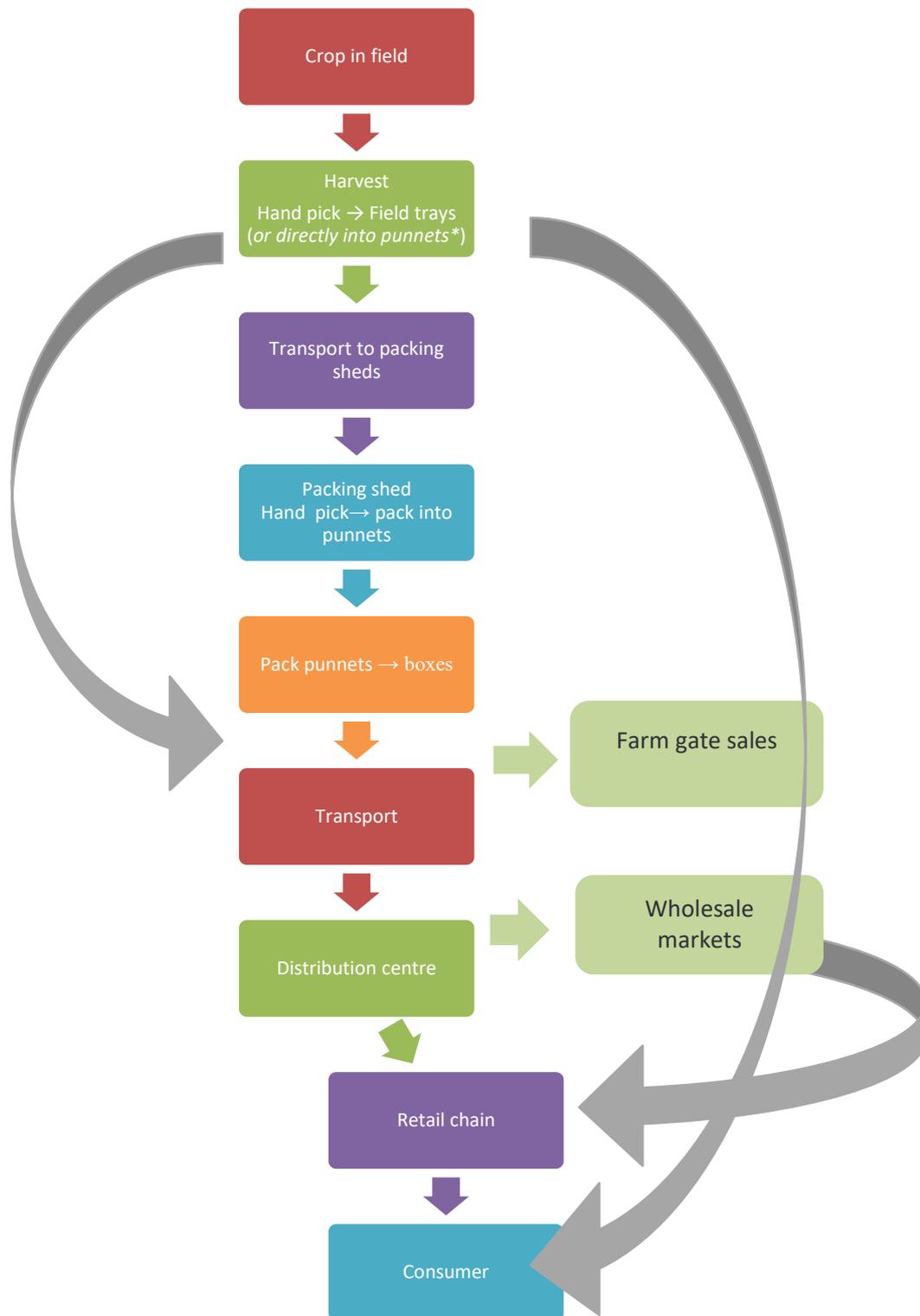
### *Transport and distribution*

Most strawberries are distributed through major retailer distribution centres or wholesale fruit markets. A small amount may be distributed directly to small retailers, farmers markets or sold directly from farm packhouses/farm gate.

### *Retail*

The retail stage may involve further distribution/transport to individual retail stores. Punnets may be cold stored before being displayed (either under refrigeration or at ambient temperature) for consumer purchase.

\* **Figure 1:** Strawberry supply chain flowchart



\* *Pick your own facilities*

## Appendix 2 – Horticulture industry bodies

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The Department of Agriculture and Water Resources lists web 51 different horticultural industry agencies representing various commodities and regions (<http://www.agriculture.gov.au/ag-farm-food/hort-policy/links#horticulture-industry-websites>).

These include national bodies as well as many state and territory organisations (e.g. GrowCom in Queensland, <https://www.growcom.com.au/>). There are also agencies representing individual horticultural commodities. For example, Strawberries Australia Inc. states it is the peak strawberry industry body with all states having a Strawberry Growers Association affiliated to the national body (<http://www.strawberriesaustralia.com.au/>).

Some national-level horticulture bodies are briefly described below, in alphabetical order. Some information on Plant Health Australia, the national body dealing with plant biosecurity issues, is also provided at the end of this appendix, as it was identified as a possible useful model for horticultural collaboration.

### National horticulture bodies

#### Australian Institute of Horticulture Inc.

The institute's purpose is 'to represent professional horticulture practitioners across Australia, to encourage and develop relationships with affiliate and like organisations to deliver the highest quality and productive results to any horticultural project.' The institute claims to be the only organisation to offer Registered Horticulturist as an accreditation. <https://www.aih.org.au/about-us/>

#### Australian Society of Horticultural Science

This is a society for the promotion and enhancement of Australian horticultural science and industry, with members from research institutions, universities and industry, as well as private citizens and students. <http://aushs.org.au/>

#### Fresh Produce Safety Centre

The centre is an industry-led, not-for-profit company funded and led by fresh produce industries in Australia and New Zealand to enhance fresh produce safety through research, outreach and education. <https://fpsc-anz.com/>

#### Fresh Produce Watch

No longer active, Fresh Produce Watch was established in 1991, initiated by the Australian Apple and Pear Growers Association, Australian United Fresh and the Australian Horticultural Corporation.

#### Hort Innovation

One of Australia's 15 rural research and development corporations, Hort Innovation is a not-for-profit, grower-owned research and development and marketing company for Australia's horticulture industry. <https://horticulture.com.au/>

## Horticultural Media Association Australia Inc.

This association's purpose includes providing a point of mutual contact and communication for members of the horticultural media. <https://hmaustralia.com.au/about/statement-of-purposes/>

## Produce Marketing Association Australia-New Zealand (PMA A-NZ)

PMA A-NZ represents member companies from every segment of the fresh fruit, vegetable and floral supply chain. The association aims to help businesses increase their sales to regional and global consumers and develop internal business capabilities.

Membership includes seed companies, growers, packers, processors, shippers, importers and exporters, wholesalers and retailers, foodservice, government agencies, associated suppliers to the industry. Major members include Hort Innovation, major supermarkets, One Harvest and Fresh Produce Group. <https://www.pma.com/global-pma/anz>

## Voice of Horticulture

Voice of Horticulture is a member-based organisation that represents horticultural growers and businesses across fruit, vegetables, nuts, mushrooms, turf, nursery plants and cut flowers. <http://voiceofhorticulture.org.au/about.php>

## Plant Health Australia (PHA)

Attendees of the industry roundtable meeting held for the purposes of this report indicated that PHA may serve as a useful model of a successful representational agency.

PHA is the national coordinator of the government–industry partnership for plant biosecurity in Australia. It is a not-for-profit company providing a service on behalf of the national plant biosecurity system. It was established in 2000 in response to a proposal in the 1996 Nairn Review of Quarantine to form a national coordinating body to deal with plant health.

Company activities are funded from annual subscriptions paid by members, which include the Australian Government, all state and territory governments and national representative plant industry organisations.

PHA has a national office in Canberra and is run by a team of specialist staff and a skills-based Board of 8 Directors. <http://www.planthealthaustralia.com.au/>

## Emergency Plant Pest Response Deed

PHA is the custodian of the Emergency Plant Pest Response Deed<sup>1</sup> (EPPRD), a formal legally binding agreement between PHA, the Australian Government, all state and territory governments and national plant industry body signatories (currently including Strawberries Australia). The deed covers the management and funding of responses to emergency plant pest incidents, and formalises plant industries' role in decision making and costs contributions.

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<sup>1</sup> The Emergency Plant Pest Response Deed is available at <http://www.planthealthaustralia.com.au/wp-content/uploads/2018/08/EPPRD-22-August-2018.pdf>

## Appendix 3 – Example risk/crisis management resources

### Freshcare Code of Practice and standards

Freshcare is Australia's largest fresh produce industry assurance program that underpins food safety compliance for most Australian fresh produce businesses. It is owned by 27 peak industry bodies that link Freshcare to individual members. More than 5500 businesses have adopted the program. (See <https://www.freshcare.com.au/>).

Participating businesses must comply with the Freshcare Rules and requirements of the relevant Freshcare codes and standards. Training and additional resources are provided to help participating businesses integrate these requirements into their operations, and achieve certification through audit. Freshcare's suite includes the following:

- Code of Practice: states that, although not preventable, food defence and food fraud issues can be addressed through vulnerability assessments (<https://www.freshcare.com.au/wp-content/uploads/Freshcare-Food-Safety-Quality-Edition-4-Code-of-Practice.pdf>).
- Food Safety & Quality – On-farm Standard Edition 4 (FSQ4): Section F12 *Food defence and food fraud* requires that a vulnerability assessment is completed to assess risk of intentional contamination of raw materials or end product and, where a food defence threat is identified, a control plan is documented. (<https://www.freshcare.com.au/standards/food-safety-quality/>)
- Food Safety & Quality – Supply Chain Standard Edition 1 (SC1): Section M6 *Business continuity and incident management* requires an incident management plan to be documented, followed and regularly reviewed. Section F12 on food defence and food fraud has similar requirements to the On-farm standard. (<https://www.freshcare.com.au/standards/food-safety-quality-supply-chain/>)

Freshcare Food Safety & Quality – Supply Chain Standard sections M6 and F12:

M6 Business continuity and incident management		
Standard Element	Compliance Criteria	Records
M6.1 Prepare an incident management plan to support business continuity.	<ol style="list-style-type: none"> <li>An incident management plan is established to support business continuity and identify ways to: <ul style="list-style-type: none"> <li>reduce the likelihood of an incident occurring</li> <li>ensure produce food safety and quality is not compromised</li> <li>respond to, and recover from, an incident.</li> </ul> </li> <li>The incident management plan is documented and must include: <ul style="list-style-type: none"> <li>potential risks to business continuity</li> <li>strategies and practices to manage identified risks</li> <li>workers responsible for incident management</li> <li>details of internal and external stakeholders</li> <li>name of person documenting the plan</li> <li>date plan is developed.</li> </ul> </li> <li>When an incident occurs, the incident management plan is followed to ensure: <ul style="list-style-type: none"> <li>produce safety and quality is not compromised</li> <li>affected produce is identified and isolated</li> <li>compliance with food safety and quality requirements is verified, prior to produce release.</li> </ul>           A record is kept. </li> <li>A test of the incident management plan is conducted annually. A record is kept.</li> <li>The incident management plan is reviewed at least annually, and after any event requiring the incident management plan to be actioned. A record is kept.</li> </ol>	SC1 Form – M6 Incident management plan  Incident response record
 <b>Freshcare Resources</b> <ul style="list-style-type: none"> <li>SC1 Factsheet – M6 Business continuity and incident management</li> </ul>	<b>External Resources</b> <ul style="list-style-type: none"> <li>Department of Industry, Innovation and Science – Business: The continuity plan section <a href="http://www.business.gov.au">www.business.gov.au</a></li> </ul>	

F12 Food defence and food fraud			
Standard Element	Compliance Criteria	Records	
F12.1	Identify potential food defence threats that may impact food safety and implement control measures where required.	<ol style="list-style-type: none"> <li>A food defence vulnerability assessment is completed to assess the risk of intentional contamination of: <ul style="list-style-type: none"> <li>raw materials (business inputs or produce)</li> <li>end product.</li> </ul> </li> <li>Where a food defence threat is identified, a control plan is documented and must include mechanisms for control.</li> <li>The vulnerability assessment and control plan is reviewed at least annually and updated when changes occur.</li> </ol>	SC1 Form – F12 Food defence vulnerability assessment and control plan
F12.2	Identify potential vulnerabilities for food fraud that may impact food safety and implement control measures where required.	<ol style="list-style-type: none"> <li>A food fraud vulnerability assessment is completed to assess the potential risk of intentional adulteration, substitution or misrepresentation of: <ul style="list-style-type: none"> <li>raw materials (business inputs or produce)</li> <li>end product.</li> </ul> </li> <li>Where a food fraud vulnerability is identified, a control plan is documented and must include mechanisms for control.</li> <li>The vulnerability assessment and control plan is reviewed at least annually and updated when changes occur.</li> </ol>	SC1 Form – F12 Food fraud vulnerability assessment and control plan
	<b>Freshcare Resources</b> <ul style="list-style-type: none"> <li>SC1 Factsheet – F12 Food defence and food fraud</li> </ul>	<b>External Resources</b>	

## Horticulture Industry Crisis Management Guidelines

These guidelines were developed in 2010 through a project funded by Horticulture Australia Ltd (Project AH07033 Incident Response Protocol – Development and training for horticulture). They were designed to help members of the industry respond to a crisis or uncontained situation on an individual company level, specific industry level or cross section of the horticulture industry.

The guidelines include a self-assessment tool to determine preparedness, as well as information and templates for contingency planning and crisis management actions such as recalls and responding to media and consumer inquiries. They are available on the Fresh Produce Safety Centre website at <https://fpssc-anz.com/wp.../horticulture-industry-crisis-management-guidelines-v1.pdf>

Figure: Sample page from the guidelines

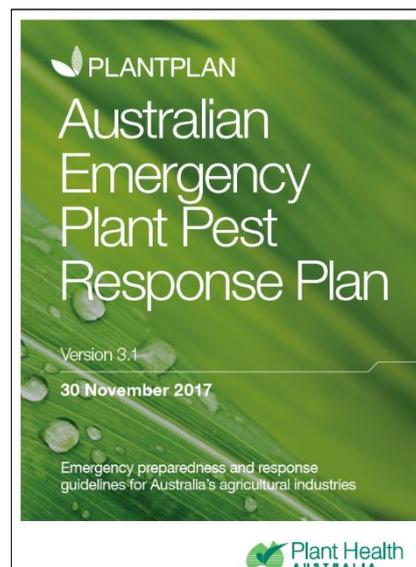
At the beginning of any crisis you must start a Log and maintain it throughout.

	Process Cards	Forms
Start to develop your understanding of the threat or event	<a href="#">Card 1</a> Initial Actions	Complete the Situation Report ( <a href="#">Form 1A</a> )
<ul style="list-style-type: none"> <li>□ What are the risks to the industry/company; what steps should be taken; and who should be responsible?</li> <li>□ Start to think about the Crisis Tracking Form.</li> <li>□ Identify the critical success factors.</li> <li>□ Preserve any Evidence</li> </ul>	<a href="#">Card 2</a> Risk Review	Use Risk Assessment Form ( <a href="#">Form 1B</a> )  Use Guidelines ( <a href="#">Form 1E&amp; 1G</a> )
Specific actions required to manage the incident and who should be responsible.	Role Specific Actions <a href="#">Card 3</a> – CMC <a href="#">Card 4</a> – CMT <a href="#">Card 5</a> – Admin <a href="#">Card 6</a> - Media	Crisis Tracking Form ( <a href="#">Form 1C</a> )
<b>All Users</b> <ul style="list-style-type: none"> <li>□ Has the Event ended?</li> <li>□ What lessons can the Industry/Company learn from the Crisis?</li> </ul>	<a href="#">Card 7</a> Crisis Conclusion	Crisis Tracking Form ( <a href="#">Form 1C</a> ) Crisis Learning Form ( <a href="#">Form 1H</a> )

## PLANTPLAN

PLANTPLAN, also known as The Australian Emergency Plant Pest Response Plan 2017, is the agreed national biosecurity response plan triggered when an emergency plant pest or suspect pest is detected. It provides nationally consistent guidelines for response procedures under the Emergency Plant Pest Response Deed (see further information under Plant Health Australia in Appendix 2). It outlines the phases of a plant pest incursion, and key roles and responsibilities of industry and government. The plan is regularly reviewed and updated, and is available online at

<http://www.planthealthaustralia.com.au/wp-content/uploads/2017/12/PLANTPLAN-30-November-2017.pdf>



## Industry Biosecurity Plan for the Strawberry Industry

According to the Plant Health Australia website, this plan outlines key threats to the strawberry industry and provides risk mitigation plans, identification and categorisation of exotic pests and contingency plans. An online copy was not available at the time of producing this report.

## Appendix 4 – Metal detectors in the food industry

Metal detectors generally use electromagnetic fields to identify foreign objects that are magnetic and/or conductive. They can potentially pick up a range of metal contaminants including ferrous (carbon steel, iron) and non-ferrous (brass, bronze and other alloys) materials.

Characteristics of the food and packaging can affect the sensitivity of detecting metal contaminants in a product. This influence is called its 'product effect'. The more conductive a product is, the higher its product effect and the worse the detection sensitivity becomes. The main influencing factors are the product's:

- moisture content
- composition, particularly the presence of salts or other conductive elements
- temperature
- size and shape
- position and orientation through the detector
- consistency or density
- packaging material
- inspection frequency.



Screen shot from A&D Weighing video

Because of these influences, the inspection set-up needs to use validated testing regimes and be fit for purpose. A sample video showing a metal detector screening strawberries is available to view<sup>1</sup> (and see image).

Estimate costs of an in-line industrial metal detector (suitable for a strawberry producer) are between \$17,000 and \$50,000 depending on the size and set up of machinery. There are additional costs for the initial set up and installation, automated rejection or weighing modules, training of personnel and ongoing maintenance. Suitable equipment may be available to rent for seasonal production.

For comparison, X-ray inspection equipment is much more expensive, but can detect a wider range of contaminants (including stone, bone, high-density plastics, rubber and thick glass). X-ray systems are limited in detecting lightweight contaminants such as thin glass, light plastic, insects, wood and cardboard. They are also limited by the density of the product itself; the denser the produce, the darker the X-ray image, meaning lower density contaminants are harder to detect.

### Further information

Metal detectors for food processing <https://www.andweighing.com.au/products-service/metaldetectors-checkweighers/ezi-check-metal-detector>

Metal detection in the food industry <https://www.loma.com/en-GB/Industry-Guides/Guide-to-Metal-Detection-in-the-Food-Industry>

<sup>1</sup> Metal detection in strawberries – Punnet vs crate? YouTube video, A&D Weighing [https://www.youtube.com/watch?v=Cq8m8e\\_lbCc](https://www.youtube.com/watch?v=Cq8m8e_lbCc)