REPORT OF WPC80
INDEPENDENT INQUIRY
FOR FONTERRA BOARD

23 October 2013

REPORT OF WPC80 INDEPENDENT INQUIRY

Contents

FOREWORD

No major food products company would ever want its name linked in news media headlines with the word "botulism". No board of directors would ever want to receive late night advice that such headlines were only hours away. But those were the circumstances in which Fonterra found itself in August 2013, and the context in which the Fonterra board established an independent inquiry process.

That process has involved two tiers:

- a special oversight committee, appointed by (but operating independently of) the Fonterra Board (*Committee*), chaired by Sir Ralph Norris, comprising two other appointed (independent) directors, Simon Israel and John Waller, with two farmer-elected directors, Blue Read and Professor Nicola Shadbolt, and supplemented by two distinguished non-directors – retired High Court judge, Dame Judith Potter, and Auckland University Vice Chancellor, Professor Stuart McCutcheon;

- the independent Inquiry team – Dutch dairy industry expert, Jacob Heida; Australian crisis management and communications expert, Gabrielle Trainor; with leading New Zealand lawyer, Jack Hodder QC, and his Chapman Tripp colleagues.

The Committee has overseen and reviewed the work of the Inquiry team over several weeks. This has been a valuable process for all concerned. At the end of the process, the Committee is well satisfied that the Inquiry team has undertaken the thorough, consultative, independent and incisive analysis that the board expected when the Inquiry was commissioned.

The Committee has noted, and endorses, the key recommendations and the themes identified by the Inquiry team. Those include:

- the reminder that Fonterra is a very successful global business, with expertise, efficiency and values that it is justifiably proud of;

- the recognition that Fonterra is well advanced on a "journey" from being a cost-focussed dairy ingredients producer to being a customer-focussed global food products supplier that is second to none in its aspirations, standards and people;

- the opportunity created, especially in some areas of weakness highlighted by the WPC80 precautionary recall events, to further strengthen Fonterra's processes, culture and governance;

- the need to respond fully to the increased global consumer expectations of conspicuous food safety and quality excellence;

- a need to engage comprehensively with stakeholders, including in the context of Fonterra's position as a "national champion" within the New Zealand economy.

The fact that the "botulism scare" was a false alarm does not diminish the work of the Inquiry. While it may be inaccurate and unfair, in some markets Fonterra is associated with the melamine events in China of 2008, and concerns about DCD in fertilisers earlier in 2013, as well as the WPC80 events. The Committee has no doubt that a further episode would have serious global implications for Fonterra. That means that it is important for Fonterra to demonstrate its willingness to learn from the WPC80 events.

That willingness has already been demonstrated by the early completion and current implementation of Fonterra's internal Operational Review. The Inquiry team has endorsed the work of that Review and its early implementation. However, there are other meaningful changes to be made, including in Fonterra's culture and governance, as proposed in the report.

The Committee is aware that the Inquiry's work has at times been uncomfortable for directors and management. Similarly, the Inquiry's findings and recommendations involve some criticisms of past performance and practices. But the Committee is satisfied that the Inquiry team's approach has been constructive and fair, and that those findings and recommendations are important foundations for Fonterra's continuing success. Accordingly, the Committee strongly recommends that the Fonterra Board publish the full report.

Sir Ralph Norris

Dame Judith Potter

Simon Israel

Professor Stuart McCutcheon

Blue Read

Professor Nicola Shadbolt

John Waller

PREFACE BY INQUIRY TEAM

This report was commissioned by the board of Fonterra on 8 August 2013, five days after Fonterra announced a precautionary recall of three batches (totalling 38 tonnes) of whey protein concentrate. An external test of the product had indicated that it had potentially been contaminated with a strain of *Clostridium botulinum*.

At the time of announcing an independent inquiry, Fonterra's Chairman, John Wilson, said he expected it to "*challenge every aspect of the business. We want to know how this happened, and why. We want…to take steps to build systems and procedures in Fonterra, and the global dairy supply chain, that will reduce the chance of this ever happening again.*"

It is now a matter of history that the precautionary recall was proven to be a false alarm. On 28 August, it was announced that additional independent testing had established that there was no presence of *C. botulinum* in the whey protein concentrate.

While the "all clear" announcement was a huge relief to all concerned, it nonetheless raised further questions about how Fonterra had found itself in this position.

The Inquiry team has sought to fulfil the expectations of the Chairman, the Board and the wide range of Fonterra's stakeholders by working over the past two months or so to establish what went wrong and why, and (more importantly) to point to what it sees as the lessons for the future.

In doing so, members of the Inquiry team have visited eight plants, conducted interviews with over 70 people within Fonterra, from the Board down, and also had discussions with over 30 of Fonterra's key stakeholders in a number of markets – customers, farmer/owners, politicians and regulators, members of the diplomatic corps, industry stakeholders, members of the media, financial analysts and institutional investors and employees.

The interviews have all been conducted on an unattributable and confidential basis. The review team wishes to thank all who participated for their constructive involvement, their candour and their valuable insights.

The Inquiry team has also benefited greatly from its collaboration with the special oversight committee, whose membership is outlined in their Foreword to this report.

Few if any organisations have voluntarily opened themselves to the intensive scrutiny involved in the Fonterra Board (i) commissioning this Inquiry's independent review of the context, contributors and responses to a particular incident, (ii) providing full access to people and documents, and (iii) publishing the resulting report. The Inquiry team has appreciated the corresponding responsibility and trust inherent in its wide brief. To avoid any doubt, the Inquiry team records that it has not been constrained or impeded in its work by the Board or management of Fonterra.

Any inquiry of this nature will tend to focus on a few things that, with advantages of hindsight, could or should have been done better. This Inquiry is no exception. But it needs to be kept in mind that that tendency will obscure the reality that most things continue to be done extremely well.

Thus, although it might go without saying, it is probably a useful reminder for the Inquiry to record that Fonterra is a high quality organisation with talented and dedicated people. It has great efficiency, well developed systems and processes, and ongoing commitments to food safety and quality and to continuous improvement. The WPC80 events have already generated significant improvements, illustrated by the prompt Operational Review, and the progress on its implementation. This Inquiry's report should be read with those reminders kept in mind.

The Inquiry team has been left with a strong impression that Fonterra will use the WPC80 events as a catalyst for positive operational, cultural and governance change and that it will continue to build on important changes for the good already underway. That would be a very fine legacy from a very difficult period in Fonterra's history.

JACK HODDER QC

GABRIELLE TRAINOR

JACOB HEIDA

EXECUTIVE SUMMARY

This Executive Summary comprises a selection of only some of the points discussed in Sections I and II of the Inquiry's report (and the Appendices). As explained in Section I, the Inquiry considered a wide range of sometimes complex matters; and any summary involves simplifications – this Executive Summary being no exception.

Further, as explained in the Preface, any major inquiry will tend to accentuate a few negative considerations. This tendency requires a balancing reminder about the many positive considerations – here including the impressive quality of Fonterra's people and plants, and its pre-existing commitments to food safety and quality and continuous improvement across the organisation.

The WPC80 precautionary recall

X1. Very early on Saturday, 3 August 2013, Fonterra issued media statements headed "Fonterra advises of quality issue". These stated that Fonterra had advised eight of its wholesale customers of potential contamination in its manufacturing of a relatively small quantity of whey protein concentrate (*WPC80*), an ingredient used in various food products, including some designed for babies and infants. This advice related to the potential existence in the affected WPC80, and downstream food products, of a micro-organism, *Clostridium botulinum* (*C. botulinum*), associated with the toxic but rare condition known as botulism.

X2. The potential connection of *C. botulinum* toxins with the WPC80 and downstream products, especially infant formula, caused immediate grave concerns for consumers, Fonterra's ingredient customers and health safety agencies in New Zealand and overseas. Several countries imposed more or less focussed product bans on imports and sales, and precautionary recalls were undertaken by manufacturers.

X3. These concerns and consequences were relayed and compounded by intense coverage, in New Zealand and globally, in the traditional news media and in social media. This media coverage remained intense throughout much of August. However, it tapered off markedly following advice on 28 August 2013 by the New Zealand Government that further commissioned testing of the suspect Clostridium samples had established that they were not *C. botulinum* and they were not toxigenic. In other words, the earlier testing (pre-August, which had led to the precautionary advice by Fonterra and New Zealand Government) had involved "false positives". With hindsight, the consumers of products containing the relevant batches of WPC80 were never in fact in danger from *C.botulinum*.

The Inquiry

X4. The Fonterra board promptly established an independent inquiry (*Inquiry*) into the WPC80 events. The Inquiry's terms of reference included verification of the relevant sequence of events (*narrative*) and identification of the stages within that narrative where choices were made within Fonterra which contributed to the occurrence and scale of the events and the effectiveness of the responses (*decision points*). More importantly, the Inquiry was required to report on lessons to be drawn from the narrative and decision points, including in respect of governance, management, culture, accountabilities, procedures and training, and from a range of perspectives (e.g. food quality and safety, crisis management, communications and government relations).

X5. To ensure its independence, the Inquiry was given its own mandate to review the entire narrative of the WPC80 events and responses, including the acts or omissions of the Board, management and of other Fonterra personnel. The personnel involved in the Inquiry team, and a majority of the oversight Committee are neither employees nor elected

directors of Fonterra. And the Inquiry proceeded without direction, monitoring or constraint by Fonterra's senior management.

Inquiry focus on organisation, not individuals

X6. As with most critical incidents, neither a single event, nor the actions of a single person can be held entirely responsible for the WPC80 precautionary recall. Crises are usually the product of a chain of actions, decisions and coincidences, whose compounding effect triggers a significant threat to safety or security. Consistently with the preceding discussion, the Inquiry has made a conscious decision *not* to name individuals in this report. The Inquiry has necessarily focussed on issues broader than the performance of particular individuals. Individuals within Fonterra operated in the context of the organisation's contemporary processes and guidelines – or lack of such. Further, naming individuals who may have made errors of judgement could only (and gratuitously) create other difficulties for those who have already faced considerable stress in the context of the WPC80 narrative.

X7. The Inquiry has not recommended that "heads should roll" at Fonterra over the WPC80 events and responses for several reasons. *First*, "heads should roll" is essentially a colloquial reference to termination of employment, and employment law issues are properly a management responsibility and involve questions of confidence, privacy and fair procedures beyond the scope of this Inquiry. (As it happens, the Inquiry has not identified any action where the relevant Fonterra personnel were not seeking to act in what they assumed were Fonterra's best interests.) *Second*, the Inquiry has seen no basis to suggest to the Board any review of the employment of the Chief Executive. *Third*, because the errors of judgement which might be attributed to individual employees are essentially the result of gaps in Fonterra's procedures and training. *Fourth*, because the most valuable and long term consequence of errors of judgement by employees is to be able to identify and fix gaps in Fonterra's procedures, training, structures and incentives.

Primary findings: "things that went wrong"

X8. While bearing in mind the reminders above about simplification of complexity, and Fonterra's qualities and achievements, the Inquiry has necessarily addressed two central questions, most simply stated as:

- What went wrong (the contamination concern events, and Fonterra's responses)?
- What needs to be done to avoid a repetition?

X9. This report addresses those questions in some detail by reference to the "narrative" of events and the "decision points" (i.e. where choices were made within Fonterra which contributed to the occurrence and scale of the events, and the effectiveness of the responses).

X10. The Inquiry found that the primary "things that went wrong" were as follows:

(1) Fonterra did not include any SRC tests in relation to any of its production of WPC, notwithstanding its acceptance of SRC tests under at least one contract with a major customer to manufacture products utilising WPC80.

(2) Some errors of judgement were made in preparation for the reworking process applied to the relevant WPC80 batches at Hautapu.

(3) The standard pre-start up automatic cleaning regimes used by Fonterra plants required improvement.

(4) There was insufficient senior oversight of the crucial decision to engage AgResearch to test for *C. botulinum*.

(5) The commissioning, design and limits of the *C. botulinum* testing were inadequate.

(6) Fonterra was unable to promptly and definitively track the destinations of the affected WPC80 batches.

(7) There was only belated recognition (and delayed escalation to senior management and

the Board) of the explosive reputational risk involved – a failure to "join the dots" between (a) *C.botulinum*, (b) infant food products, (c) consumer sensitivities, and (d) Fonterra's global reputation.

(8) Fonterra's crisis management planning, including the external communications aspects, was inadequate for an event of this kind and scale.

(9) Fonterra management of these events in the critical early period, including the external communications aspects, was not well executed.

(10) There was some lack of alignment and confidence between Fonterra and the New Zealand Government in the critical fortnight after the contamination concerns were advised to the Government and made public.

Operational recommendations

X11. Inevitably, a list of things to be done to avoid events and responses of a comparable nature will track those matters identified as having "gone wrong" in the context of the WPC80 events and responses. These can be considered at both a practical level and a governance/culture level. Again, the risk of oversimplification should be kept in mind, as should the acknowledgements and reminders mentioned earlier.

X12. The principal operational recommendations by the Inquiry include:

First, that Fonterra's food quality and safety specifications and testing be reviewed to ensure that they are of "best in class" standard: consistent with the most rigorous requirements of customers, and with international best practice.

Second, that risk management and crisis management processes be strengthened, including by establishment of a specially trained and multi-disciplinary (but not full-time) Incident Management Team and regular relevant training, global best practice product tracing systems, and a new Risk Committee of the Board.

Third, that reputational risk assessment form part of the criteria for escalation and assessment of non-standard external scientific tests.

Fourth, that plant cleaning programmes be amended.

Fifth, that there be continued building of a directly-employed strong, specialist and experienced communications team, including in key global markets, supplemented with contracted high calibre local expertise where appropriate.

Sixth, that there be enhanced and sustained efforts to address a "Fortress Fonterra" perception held by a material proportion of key stakeholders, by Fonterra redefining the style and substance of its engagement with them.

Seventh, that the Inquiry be reconvened after nine months and again after 18 months to review Fonterra's progress on those recommendations.

(A list of all Inquiry recommendations is set out in the separate "Recommendations" section, and – with context – in Section I of the report. A number of these operational recommendations relate to work already in progress within Fonterra, including as a result of its August 2013 Operational Review: see Appendix J.)

Recommendations relating to the Board

X13. The principal Inquiry recommendations relating to the Fonterra Board include:

First, the Board should endorse explicitly as a core principle that Fonterra, as "one company", always strives to perform at the best practice level for leading global food product organisations.

Second, the Board should similarly explicitly endorse the paramount importance of food quality and safety to Fonterra's global and local reputation.

Third, the "risk" component of the Board's Audit, Finance and Risk Committee should be transferred to, and developed by, a separate Risk Committee.

Fourth, the Board should accept greater responsibility for developing and maintaining relationships at the most senior levels of Fonterra's external stakeholders, including in government and media within and outside New Zealand.

Fifth, the Board should actively review ongoing progress towards shedding the adverse "Fortress Fonterra" perception held by a material proportion of external stakeholders.

Specific matters

- Fonterra's plant operating standards

X14. Insofar as the WPC80 events commenced with contamination during processing at one of Fonterra's operating plants, it is appropriate to record the relevant conclusion of the Inquiry team's international dairy industry expert. After his inspection of eight Fonterra operating plants, in the North and South Islands and in Victoria, he concluded that Fonterra is operating in a way expected of a good producer of nutritional products. That is a very high standard, even if there is always some room for further improvement.

- Absence of "routine" tests for C.botulinum?

X15. There is no available "routine" test to identify *C. botulinum* in dairy processing. There can be (and is already) expanded routine testing for SRC levels, but identifying *C. botulinum* is very difficult – the most definitive tests still involve injection of test mice for mouse bioassays. An August 2013 report by the International Union of Microbiological Societies (*IUMS*) explains that detection of *C. botulinum* is difficult, partly because of the numerous different strains which require multiple different methods to detect. Furthermore, confirmation of toxin production requires mouse bioassays which not only raise ethical issues, but also are not suited to routine food microbiology laboratories as special security and biosecurity precautions are required. There are only a limited number of specialised laboratories in the world that are able to do this work. And even then, mouse bioassays have drawbacks, including mice deaths related to causes other than *C. botulinum.*

- Failure to escalate

X16. The Inquiry received substantial comments about organisational culture and escalation, in the context of decision-making. In particular, those comments reflected the well justified frustration that knowledge of the WPC80 issues arrived far too late at senior management and board levels. Insofar as the cultural objective here is the asking of pertinent questions about food safety or non-standard testing issues, including asking more senior personnel, the Inquiry agrees that this is essential, and that all Fonterra personnel should be encouraged (from induction) to consider their work in its wider context – to be able to "join the dots".

X17. On the other hand, a simple emphasis on escalation may be a recipe for the avoidance of decisions and

the responsibility of managers to make decisions. It is not practicable to be prescriptive about any particular balance between these factors, and others (including efficiencies). The objective will always be considered and intelligent decision-making, and discussion (including escalation) where there is doubt.

- Attention to stakeholders, relationships

X18. The sheer size of Fonterra's economic footprint is enough to attract exceptional scrutiny. But this is compounded by its statutory foundations (the 2001 merger which created Fonterra required enabling legislation), and its being so large in the New Zealand economic context that it has come to be perceived as the national economic flag bearer. Those factors attract heightened political and news media scrutiny, and a sense of the public as a stakeholder, not applicable to other private New Zealand businesses.

X19. A perception of Fonterra that was conveyed to the Inquiry, mostly by those outside the organisation, was of self-centredness – that Fonterra is focussed on its own immediate interests and insufficiently concerned with the interests of, or relationships with, others. For any business, a perceived neglect of some stakeholders is problematic. For Fonterra, with its involuntary "national champion" status, such perceived neglect requires serious remedial attention.

X20. The larger the organisation, the harder it needs to work to ensure its stakeholder relationships are trusting and sustained, that it acts with transparency and credibility and it does not suffer from lack of responsiveness and accusations of being a "fortress". Based on the views put to the Inquiry by a large number of different stakeholders, Fonterra is not immune from this imperative. (See Appendix I.)

X21. These views evidently persist in some areas notwithstanding Fonterra's serious efforts to build up the relationships with its stakeholders. Thus, for example, Fonterra's recent and current roll-out of the "Milk in Schools" programme is (at some NZ$20m per year) the largest community and social responsibility (*CSR*) programme in New Zealand's history. Nevertheless, the Inquiry considers that one of the most important steps Fonterra should now take is to use this opportunity to review and enhance both the substance and the style of its engagement with the people, organisations and communities that are important to it, to re-establish trust (where necessary) and to ensure lasting, mutually-beneficial relationships.

- Crisis management planning, performance

X22. The need for preparations for crises, including credible and relatively frequent simulations, is well understood in international business. Close to home, Air New Zealand was cited to the Inquiry on several occasions as exemplary in this regard. And it is an important aspect of a food products business. As noted earlier, while the WPC80 events were complicated because the immediately affected product was an ingredient, and the Inquiry has all the benefits of hindsight, the Inquiry is satisfied that better crisis management processes and planning within Fonterra, including rehearsals and a designated crisis (or incident) management team, would have made a substantial difference.

X23. In the first few days after the WPC80 issue became public, Fonterra did not seem to make it clear the recall was precautionary, it did not say sorry, and it was inconsistent in its tone – sometimes quite alarming, at other times seeking to minimise. The persistent adjustments to the estimates of affected product were corrosive of Fonterra's credibility with Ministers and officials. There is a significant body of research and "best practice" knowledge on how to promote strong relationships and communicate during usual times, and in times of risk and crisis, so as to maximise trust and credibility. Fonterra's communications style and substance did not consistently demonstrate the characteristics of that knowledge.

- Regulatory framework

X24. The nature of the regulatory framework is a matter for the New Zealand Government. As this Inquiry could not require information and attendance by government agencies, that topic is appropriately considered in detail by the current Ministerial Inquiry (which has relevant statutory powers). However, on its analysis, and its comparison with overseas regime, this Inquiry considers the New Zealand regulatory architecture to be sound. Further, this Inquiry did not see the various cumulative factors contributing to the WPC80 narrative as having been compounded by any deficiencies in the regulatory framework. The Inquiry did see scope for significant and sustained investment in deepening relationships and confidence between Fonterra and both regulatory organisations and the New Zealand Government generally.

- No assessment of government agencies

X25. The Inquiry has not assessed the performance of various government agencies and personnel during the WPC80 events for several reasons: *First*, basic principles of natural justice count against any assessment where the party to be assessed cannot engage fully with the assessors. That is the position with government agencies and personnel who generally have no direct obligations to Fonterra, but do have their own accountability and obligations under statute, or to Ministers. *Second*, there is a need for both Fonterra and government agencies to invest more (and more consistently) in improved relationships. This objective could only be damaged by this Inquiry seeking to judge those government agencies on incomplete information, and then reporting such judgements to the Board and more widely. *Third*, this is a topic eminently suitable for the Ministerial Inquiry.

Will anything really change?

X26. Yes. The Inquiry is confident that both the Board and the senior management of Fonterra have a strong and genuine belief that Fonterra must change (by making major operational improvements and re-evaluating its stakeholder relationships) in the light of lessons from the WPC80 narrative.

FULL LIST OF RECOMMENDATIONS

The following list of recommendations by the Inquiry is drawn from Section I of the report (Overview and Questions) which should be read to provide the necessary context for the recommendations. It may be added that many of the "operational" recommendations overlap with those of Fonterra's internal Operational Review (see Appendix J), and are already being implemented.

Operational

(R1) Ensure that Fonterra's specifications (and associated testing) for potential food quality and safety (*FQS*) issues across nutritional product ingredients manufactured for Fonterra are of "best in class" standard: consistent with the most rigorous requirements of customers, and with international best practice.

(R2) Develop and implement freshly considered procedures and criteria for reworking of product identified as unfit for intended purposes, consistent with customer expectations and international best practice.

(R3) Improve understanding of, and criteria for, change control procedures when any non-routine use is made of equipment used in relation to nutritional products and their ingredients.

(R4) Revise operational "cleaning in place" programmes to address the desirability of acid washes for pipes and equipment that have been unused for 24 hours or more.

(R5) Avoid use of flexible hoses in production processes, and particularly in processes involving nutritional products. Use of fixed stainless steel piping is preferable because it can be cleaned to a higher standard than flexible hoses.

(R6) Undertake a review into the use of bactofuges in particular production lines (e.g. nutritional products) to assist with removal of potential contaminants from product.

(R7) Elevate FQS understandings and procedures to the same impressive levels as those for health and safety for all Fonterra personnel, through revised training, incentives and monitoring processes, and with consistent and conspicuous leadership from the directors and senior managers.

(R8) Overhaul the procedures for non-routine microbiological testing within Fonterra to ensure senior management oversight of proposals for low probability/high risk internal work, and that such proposals are thoroughly assessed in advance for utility and the full range of possible consequences.

(R9) Establish a revised protocol for engagement of external scientific and diagnostic resources to ensure that any work commissioned is by institutions or practitioners of international standing, is appropriately undertaken for, and funded by, Fonterra (i.e. asking whether the proposed work is not better undertaken on a pan-industry basis), and that the analyses sought will yield results that are robust.

(R10) Improve batch tracing systems across the Fonterra organisation to enable prompt and definitive product recalls to be undertaken at a "global best practice" level, including regular training and monitoring.

(R11) Clarify and emphasise risk management protocols for early escalation to senior management of potential reputational risks, especially in relation to FQS matters, including regular training and monitoring. This includes establishing a reporting line between the National Quality Manager and the Group Director Food Safety and Quality. (In turn, the Group Director Food Safety and Quality should directly report to both the CEO and the Chairman of the Risk Committee: see Recommendation 27.)

(R12) Revise the crisis management arrangements across the organisation to "best in class", recognising that FQS reputational risks are likely to affect every market in which Fonterra has a presence (and differently). These arrangements should include regular and realistic simulations at least once (and preferably twice) a year

involving stakeholders such as customers, industry associations, scientific experts and regulators, ensuring that lessons from exercises and earlier crises are applied and incorporated into an ongoing crisis readiness programme. These simulations should include scenario testing of international product recall procedures and high-level media engagement.

(R13) Establish a permanent (but not full-time) multi-disciplinary Incident Management team (*IMT*) whose members will be able to apply additional training, a regular and stakeholder-engaged crisis simulation regime and specialist experience to advise on and manage emerging issues, potential crises and realised new crises (and who will be linked in to the Food Integrity Council, the relevant Board Committee and other relevant parts of Fonterra).

(R14) Establish a Crisis Management Plan ("owned" by the proposed IMT) establishing best practice capability including: clear lines of command, highly-trained and credible spokespeople, use of dedicated IMT rooms on declaration of a crisis incident, template preparation (including backgrounders on all operating units and appropriate protocols for any likely crisis scenario such as a product recall, Q & A, timelines), "ghost" website readiness, social media strategy, third party endorsers, and translation and language capability in all markets.

(R15) Establish and sustain (with IMT oversight) protocols with key customers to enable the most effective responses to future critical incidents, including product recalls, with clear communication lines and constructive understandings about engagement with regulators and media. (Involving key customers in simulation exercises will also strengthen Fonterra's relationships with those customers.)

(R16) Establish and sustain (with IMT oversight) relationships with a pool of scientific experts in food quality and safety who can speak to the media and the public in the event of an incident.

(R17) Continue building a directly-employed strong, specialist and experienced communications team, including in key global markets, supplemented with contracted high calibre local expertise where appropriate. (This is in line with Fonterra's 2012 Communications Review recommendation, including advice from McKinsey & Co, and in part already acted upon.)

(R18) Develop (through the communications team) a best practice "Master Communications Crisis Management Plan" aligned with the IMT's Crisis Management Plan, as well as template documents for all foreseeable scenarios, and capable of being adapted by regional offices for local market conditions and stakeholder requirements.

(R19) Develop a communications style and approach which better reflect Fonterra's values and aspirations as well as best practice risk communications, to enhance trust in Fonterra.

(R20) Conduct a systematic review of the quality of Fonterra's relationships with key stakeholders in all its markets to assist in enhancing trust and with effective management of any future critical event.

(R21) Consider the appointment of local advisory boards in each key foreign market to enhance capability, engage more sources of high-level advice and provide depth of knowledge of the politicians, regulators and opinion shapers.

(R22) Establish a best practice digital and social media strategy, including stand-alone elements in, and responsive to the needs and nuances of, each key market.

(R23) Enhance and sustain programmes for community investment, volunteering and giving as an investment in stakeholder engagement and goodwill.

Governance

(R24) The Board should explicitly endorse two unambiguous objectives as essential for Fonterra's future, and consistent with its cooperative ethos –

(a) a "one company" approach (with appropriate incentives, governance and management processes) to ensure that Fonterra as a whole performs consistently in the manner expected of a leading global food products organisation, and

(b) recognition of the paramount importance of Fonterra's global reputation, and the need to achieve and sustain a reputation second to none for the quality and safety of its food ingredients and products.

(R25) The Board should explicitly accept responsibility for oversight of progress towards those objectives, including appropriate engagement with senior managers across the organisation, in particular with those managers responsible for championing the FQS imperatives.

(R26) The Board should develop its own protocol for crisis management, including: the roles of the Chair and the CEO; the means for ensuring that sufficient timely and accurate information is available for all directors to assess their regulatory obligations; and the expectations of directors' availability.

(R27) The Board should transfer the Risk component of the Audit, Finance & Risk Committee's load to a separate Risk Committee, which should be expected to oversee the work of the proposed permanent Incident Management Team, with the expectation of direct engagement by the Committee with the leaders of that team.

(R28) The Board should review the charter for its Co-operative Relations Committee with a view to ensuring that it gives greater prominence to establishing and sustaining relationships with key external stakeholders, not least those within New Zealand's government infrastructure.

(R29) The Board should consider enhancing a programme of proactively developing and sustaining its acquaintance and relationships with Ministers, MPs, senior officials, overseas diplomats, industry allies and other "NZ Inc" leaders.

(R30) The Board should develop and articulate an explicit position regarding the relevance (and, importantly, the limits) of Fonterra's "national champion" role in relation to Fonterra's aspirations, behaviours and relationships.

(R31) The Board should encourage renewed investment by Fonterra to maximise the constructive collaboration with the New Zealand Government (including regulatory agencies), and the alignment between Fonterra's quality and commercial aspirations and the New Zealand Government's economic, food safety and diplomatic objectives and responsibilities.

(R32) The Board should encourage investment by "NZ Inc" (including the NZ Government, Fonterra itself and other food products firms) in ensuring that New Zealand has pre-eminent scientific and diagnostic resources for FQS purposes.

(R33) The Board should consider inviting the independent WPC80 Committee members, and the Inquiry team principals, to meetings in the third quarter of 2014 and again in the second quarter of 2015 to review Fonterra's responses to the Inquiry's recommendations.

SECTION I: OVERVIEW AND QUESTIONS

Contents

August 2013 …

1.1 Very early on Saturday, 3 August 2013, Fonterra issued media statements headed "Fonterra advises of quality issue". These stated that Fonterra had advised eight of its wholesale customers of potential contamination in its manufacturing of a relatively small quantity of whey protein concentrate (*WPC80*), an ingredient used in various food products, including some designed for babies and infants. This advice related to the potential existence in the affected WPC80, and downstream food products, of a micro-organism, *Clostridium botulinum* (*C. botulinum*), associated with the toxic but rare condition known as botulism. (See Appendix C.)

1.2 This advice had indeed earlier been provided to Fonterra's major customers for WPC80, to New Zealand Government departments and regulatory agencies, and to the New Zealand and Australian securities exchanges. The New Zealand Government relayed this precautionary advice to relevant government agencies and regulators in other countries where the affected WPC80, or products incorporating it, had been distributed.

1.3 The potential connection of *C. botulinum* toxins with the WPC80 and downstream products, especially infant formula, caused immediate grave concerns for consumers, Fonterra's ingredient customers and health safety agencies in New Zealand and overseas. Several countries imposed more or less focussed product bans on imports and sales, and precautionary recalls were undertaken by manufacturers. The economic and reputational costs of these matters continue, and are potentially very significant.

1.4 These concerns and consequences were relayed and compounded by intense coverage, in New Zealand and globally, in the traditional news media and in social media. This media coverage remained intense throughout much of August. However, it tapered off markedly following advice on 28 August 2013 by the New Zealand Government that further commissioned testing of the suspect Clostridium samples had established that they were not *C. botulinum* and they were not toxigenic. In other words, the earlier testing (pre-August, which had led to the precautionary advice by Fonterra and New Zealand Government) had involved "false positives": With hindsight, the consumers of products containing the relevant batches of WPC80 were never in fact in danger from *C.botulinum.*

Independent Inquiry established by Fonterra Board

1.5 The scale of the concerns associated with the prospect of *C. botulinum* contamination, and the profound implications for Fonterra's reputation, caused the Fonterra board of directors (*Board*) to promptly approve the establishment of this independent inquiry (*Inquiry*).

1.6 To ensure its independence, the Inquiry was given its own mandate to review the entire narrative of the WPC80 events and responses, including the acts or omissions of the Board, management and of other Fonterra personnel. The personnel involved in the Inquiry team, and a majority of the oversight Committee are neither employees nor elected directors of Fonterra. And the Inquiry proceeded without direction, monitoring or constraint by Fonterra's senior management.

1.7 This Inquiry was established with very broad terms of reference in relation to the circumstances which gave rise to the WPC80-related concerns, including Fonterra's responses to those concerns. However, the Board was advised that Fonterra was subject to ongoing legal risks in connection with those concerns and associated events. Hence the assessment of the potential legal risks, including privileged and confidential discussions with Fonterra personnel, was a key part of the Inquiry (and does not appear in this report).

1.8 The Inquiry's terms of reference included verification of the relevant sequence of events (*narrative*) and identification of the stages within that narrative where choices were made within Fonterra which contributed to the occurrence and scale of the crisis and the effectiveness of the responses (*decision points*). More importantly, the Inquiry was required to report on lessons to be drawn from the narrative and decision points, including in respect of governance, management, business culture,

accountabilities, procedures and training, and from a range of perspectives (e.g. crisis management, food quality and safety, communications and government relations).

1.9 More simply, the Inquiry was charged with reporting to the Board, independently of any Fonterra personnel, on what went wrong, and what should be done to avoid a repetition.

1.10 In broad terms, the Inquiry has involved the following components:

- A board Committee, chaired by one of Fonterra's independent (i.e. non-farmer elected) directors, Sir Ralph Norris, with two other independent directors (Simon Israel, John Waller), two farmer-elected directors (Blue Read, Professor Nicola Shadbolt), and two independent appointees to the Committee (Dame Judith Potter, Professor Stuart McCutcheon). This committee (*Committee*) had an ongoing oversight role in relation to the work of the other components.
- An international dairy industry expert, Jacob Heida of the Netherlands.
- A crisis management and communications expert, Gabrielle Trainor of Australia, and her supporting team.
- A legal team from Chapman Tripp, led by Jack Hodder QC (who also undertook an overall coordination and management role).

1.11 The Inquiry team members have been mindful throughout their work that the Fonterra Board expected that the Inquiry would contribute to improving the organisation to assist in preventing or mitigating and better managing any comparable future crisis. That expectation, and the relevance of lessons from the WPC80-related circumstances and events, remains notwithstanding the universally welcome later advice that the affected WPC80 was in fact not *C. botulinum* and not toxic.

Beware hindsight

1.12 Hindsight is, as often observed, a wonderful thing. But it is missing when actual decisions are made. In hindsight, it is easy to see a sequence of decisions made within Fonterra which created the circumstances that came to a head in early August 2013, which also impaired some of Fonterra's responses, and which could and should have been made differently.

1.13 Most of those decisions were understandable at the time. But there was and remains a need for high quality decisions. The Inquiry's work leads it to the conclusion that a number of the relevant decisions involved errors of judgement. These would have been influenced in part by Fonterra's processes, training, and priorities – and, in a word volunteered frequently to the Inquiry, its "culture". The WPC80 events now provide an opportunity, albeit at some incurred and future cost, to greatly improve the context for, and the achievement of, high quality decisions.

1.14 As will be apparent in what follows in this report, the fundamental lessons for Fonterra are in relation to planning for, and managing of, uncertainties. This is an especially complex area for a large global organisation, operating in markets with varying regulations, cultures and expectations – intensified where issues of food safety arise, and particularly where babies and infants are concerned.

Acknowledgements and reminders

1.15 It is important to emphasise that the Inquiry team has had the advantage of access to any Fonterra documents that they sought, and of confidential interviews with all of Fonterra's directors, with most of its senior executives, with many Fonterra employees in operational roles as well as with a significant number of representatives of internal and external stakeholders (e.g. customers, farmers, industry, investors, officials, news media). Those interviews were uniformly constructive and informative. Given the associated confidentiality, none of the interviewees are identified in this report, but their individual and collective contribution to the Inquiry's work has been invaluable.

1.16 As noted in the Foreword, any inquiry into a crisis will tend to focus on a few things that, with advantages of hindsight, could or should have been done better. This Inquiry is no exception. But it needs to be kept in mind that that tendency will obscure the achievements that have brought the organisation its level of success, and will overlook the reality that most things continue to be done extremely well.

1.17 Thus, although it might go without saying, it is probably a useful reminder for the Inquiry to record that Fonterra is a high quality organisation with talented and dedicated people. It has great efficiency, well developed systems and processes, and ongoing commitments to food safety and quality and to continuous improvement. The WPC80 events have already generated significant improvements, illustrated by the prompt Operational Review, and the progress on its implementation. This Inquiry's report should be read with those reminders kept in mind.

1.18 In particular, insofar as the WPC80 events commenced with contamination during processing at one of Fonterra's operating plants, it is appropriate to record the relevant conclusion of the Inquiry team's international dairy industry export. After his inspection of 8 Fonterra operating plants, in the North and South Islands and in Victoria, he concluded that Fonterra is operating in a way expected of a good producer of nutritional products. That is a very high standard, even if there is always some room for further improvement. (See further, Appendix E.)

1.19 Further, in case its silence is interpreted negatively, it is worthwhile for the Inquiry to emphasise that Fonterra is:

- a very successful global business, with expertise, efficiency and values that it is justifiably proud of;
- well advanced on a "journey" from being a cost-focussed dairy ingredients producer to being a customer-focussed global food products supplier that is second to none in its aspirations, standards and people;
- already implementing significant improvements in areas identified in the internal Operational Review.

How do you write a full yet readable report?

1.20 The "WPC80 issues" or "botulism scare" caused intense interest and much concern. It is impossible to assess the ongoing impact, but it is important that relevant lessons are understood and acted upon. The Inquiry team anticipates that, as well as being provided to the Board, this report is likely to be made public. This raises difficult questions: How to approach and scope this report? And who for? The Inquiry has received and considered a very large amount of material, interviewed over 100 people within and outside Fonterra, and been tutored on a wide range of topics – from anaerobic micro-organisms to Chinese social media. With enough time and resource, the Inquiry could produce a report of several hundred pages. But who would read it? And what (or who) is the principal readership?

1.21 Consideration of those questions has governed the form and size of this report. It is primarily written for the Board to enable the Board to (a) be assured that the sequence of the WPC80 events has been thoroughly and independently investigated, and (b) appreciate the context and purpose of the Inquiry's findings and recommendations. Mindful that the directors of Fonterra have heavy demands on their time, the Inquiry has attempted to balance conciseness and accessibility with the provision of sufficient context for such assurance and appreciation. Others should read this report with that in mind.

1.22 In commissioning the report, however, the Board has been aware of the importance of Fonterra to New Zealand and to all its stakeholders, and particularly to the significance of New Zealand's global reputation as a leader in food production and food quality.

1.23 The structure of this report reflects the various factors mentioned in the preceding paragraphs. The essence of the Inquiry Team's work is captured in this "Overview and Questions" section. The sequence of events is outlined, and relevant decisions are briefly discussed, in the "Narrative and Decision Points" section of the report. And

particular topics which warrant more elaborate discussion are addressed in the separate Appendices.

Complexity and simplification

1.24 One aspect of complexity in the precautionary recall was that, for the most part, the affected retail products were those of Fonterra's commercial customers, not of Fonterra itself.

1.25 Further, the many different countries which receive products from Fonterra and/or its customers have their own regulatory agencies and requirements. There are also significant political and cultural (including linguistic) differences between those countries.

1.26 Another level of complexity may be found in the detail of the regulatory regimes. The regulatory environment in New Zealand is less complex than some others, but the "wiring diagram" in Appendix A which summarises this regime is rather intimidating for the uninitiated.

1.27 In the face of complexity, and in striving for conciseness and accessibility in this report, the Inquiry necessarily simplifies or skims over many aspects of the overall narrative. As noted earlier, the objective is to provide context for the Inquiry's findings and recommendations. In a number of cases, the reasoning which underlies particular recommendations is not articulated in detail. Rather those recommendations state an informed judgement based on the detailed appreciation developed by the Inquiry team of the various contexts in which Fonterra operates. (In some other cases, topics of interest have been omitted because they relate primarily to the legal risk analysis component of the Inquiry team's work.)

"Name and shame"?

1.28 As with most critical incidents, neither a single event, nor the actions of a single person can be held entirely responsible for the WPC80 precautionary recall. Crises are usually the product of a chain of actions, decisions and coincidences, whose compounding effect triggers a significant threat to safety or security. Consistently with the preceding discussion, the Inquiry has made a conscious decision *not* to name individuals in this report and to take a constructive approach. The Inquiry has necessarily focussed on issues broader than the performance of particular individuals. Individuals within Fonterra operated in the context of the organisation's contemporary processes and guidelines – or lack of such. Further, naming individuals who may have made errors of judgement could only (and gratuitously) create other difficulties for those who have already faced considerable stress in the context of the WPC80 narrative.

1.29 It is appropriate to record at this point that the Inquiry has encountered a large number of very impressive and highly committed people within Fonterra. Conversely, in this context, the Inquiry has seen no evidence of anyone within Fonterra seeking to act otherwise than as they saw being in the best interest of Fonterra.

1.30 For completeness, the Inquiry has not considered it necessary to become involved, and it has remained entirely uninvolved, in any employment issues in relation to the WPC80 events and responses. Those are privileged and confidential matters for the parties involved.

1.31 Further, in relation to customers, and for various reasons, including to avoid identifying particular customers in a manner which might compound the difficulties already created by the WPC80 events, the Inquiry has made a conscious decision *not* to identify affected customers in this report.

A "tall poppy" problem?

1.32 New Zealand society is often described as egalitarian. It has never had a European style inherited aristocracy. Nor (with very occasional exceptions) has it had influential families with multi-generational inherited fortunes. The values of "equality" have been reinforced by the late economic development of the country, the role of central government in major infrastructure projects since the latter part of the 19th century, and substantial periods of popularly elected "centre-left" governments.

1.33 There is much to be said for the egalitarian tradition in New Zealand, but one downside is known as "tall poppy syndrome". This is an edge to the tradition which denigrates those who stand out above the rest (usually with exceptions for talented sports stars). This edge has been well honed in successive generations of news media and social commentary.

1.34 Fonterra is a co-operative formed in 2001 with the merger of the New Zealand Dairy Group and Kiwi Co-operative Dairies, together with the New Zealand Dairy Board, which had been the marketing and export agent for all the co-operatives. Securities in Fonterra Shareholders Fund were listed on both the New Zealand and Australian Securities Exchanges in November 2012. In the modern New Zealand economy, Fonterra undoubtedly stands out above the rest. In 2012, milk powder, butter and cheese accounted for 25% of New Zealand exports and about three per cent of GDP (*Statistics NZ*). The vast majority of those products are Fonterra products.

1.35 While Fonterra itself could not credibly advance the point, the Inquiry's view is that the sheer size of Fonterra's economic footprint is enough to attract "tall poppy" scrutiny. But this is compounded by its statutory foundations (the 2001 merger which created Fonterra required enabling legislation), and its being so large in the New Zealand economic context that it has come to be perceived as the national economic flag bearer. Those factors attract heightened political and news media scrutiny, and a sense of the public as a stakeholder, not applicable to other private New Zealand businesses.

1.36 These and related matters contributed to the intense attention within New Zealand when the WPC80 events entered the public domain. That attention included much criticism (not all of it factually correct or well-founded), and a significant sense of concern that Fonterra had damaged New Zealand's interests.

Some context – Sulphite-reducing clostridia (SRCs)

1.37 Some of the oldest forms of micro-organisms on our planet are categorised in the scientific literature as sulphite-reducing clostridia (*SRC*): kingdom - bacteria; phylum - firmicutes; class - clostridia. This categorisation covers perhaps 200 different species with a common feature of anaerobic respiration – they reduce sulphite to sulphide and cannot breathe oxygen. SRCs are estimated to have existed for some 3.5 billion years. They are found throughout the world, and especially in soil – including the bottom sediment of streams, lakes and seabeds.

1.38 The vast majority of SRC species are harmless for humans. This is significant because SRCs are literally everywhere, not least in food and in the gut of every bird and animal, including humans. However, some forms of SRC cause problems for humans. Some species can cause food spoilage (*C. perfringens*); and in particular circumstances, some can produce toxins dangerous to humans (*C.tetans* - tetanus; *C. botulinum* - botulism).

1.39 In the dairy industry, the level of SRCs has long been considered a general indicator of the quality of hygiene controls in the relevant manufacturing processes. In other words, a high SRC count in its product should cause a processing operation to promptly check and improve the cleanliness and hygienic integrity of its equipment and processes.

- The SRC contamination

1.40 Fonterra manufactures a significant volume of WPC at four of its New Zealand processing plants, including Hautapu (near Cambridge). None of those plants makes WPC for a specific customer – most is within a "general trade" specification. The source of a consignment of WPC sent to any particular customer will depend on the efficiency of inventory and transport logistics within and outside New Zealand at the relevant time.

1.41 Until June 2013, Fonterra's WPC was manufactured to comply with a range of specifications which did *not* include a maximum level for SRCs.

1.42 However, at least one of Fonterra's major customers had specified that a *final* product made for it at Fonterra's plant in Darnum, Victoria, and which used a small percentage of WPC80 as an ingredient, needed to comply with a particular SRC level and (where such levels were exceeded) with further tests for *C. perfringens*.

1.43 In March 2013, testing of the final product at Darnum produced results which exceeded the customer's SRC level. This was subsequently shown to be attributable to the use of two batches of WPC80 originally manufactured at Hautapu in early February 2012 but "reworked" there in May 2012, which contained abnormally high SRC levels.

- The AgResearch testing

1.44 After various phases of discussions within and between various parts of Fonterra, outlined in the "Narrative" part of this report, SRC isolates ultimately derived from the Hautapu batches were sent to AgResearch on 22 July 2013 for testing and advice on whether the SRCs were (as was assumed highly likely) *C. sporogenes*, a common but non-toxin producing species.

1.45 It is well understood in the scientific community that testing for *C. botulinum* is difficult. Most forms of testing seek to identify a genetic configuration which includes a toxin-producing capacity, and there is simply no easy nor infallible method readily available. But the most reliable methodology is considered to be mouse bioassays (*MBA*). (See Appendix C.)

1.46 AgResearch undertook the testing of the SRC isolates in July 2013. The essential question was whether the relevant species was *C. sporogenes* (expected, and no cause for particular concern) or *C. botulinum* (not expected, but with immense implications for Fonterra).

1.47 After some earlier indications that both preliminary testing and the MBA work were less consistent with *C. sporogenes* than would be expected, AgResearch reported (around midday on Wednesday, 31 July 2013) that the MBA work had yielded strong indications that the Hautapu SRC samples were *C. botulinum*. (For detail, see Appendix C.)

1.48 This advice from AgResearch caused Fonterra to intensify its work on tracing the destinations of the affected Hautapu WPC80, to consult with affected customers, and to advise relevant regulatory agencies. The matter entered the public domain so potential consumers and markets could be alerted. It attracted extraordinary news media (and, especially in China, social media) attention.

How long did Fonterra have to prepare for the issues with the WPC80 batches to go public?

1.49 At the heart of the WPC80 scare were two questions:

(a) Was there a food safety risk from the relevant Hautapu WPC80 batches?

(b) Were the batches in products currently for sale in New Zealand or elsewhere?

1.50 The first question was essentially answered "Yes" by the AgResearch MBA result advised to Fonterra's Crisis Team about midday on Wednesday, 31 July

2013. This caused the "Critical Event" (formalised on 22 July 2013) to be elevated to a "Crisis" later on 31 July. The second question was answered "Yes" by Friday, 2 August 2013. Rightly, this effectively caused Fonterra to publicly disclose the matter.

1.51 It seems clear, however, that, in relation to both questions, the expected answer within Fonterra was "No", and those expectations created a misplaced sense of security and counted against urgency in almost all aspects of the "crisis management" responses before the late afternoon of Wednesday, 31 July 2013. On the question of food supply risk, there was a general understanding in the dairy industry that *C. botulinum* contamination is not an issue in whey protein concentrates; and Fonterra's Food Assurance team at FRDC had advised that it was extremely unlikely that the Hautapu SRCs were *C. botulinum*.

1.52 On the question of tracing the WPC80 batches, and products which had used that WPC80, it appears that there was a belief that this material was either located in warehouses (and could be held there) or had been processed in a way which would destroy any SRCs (e.g., ultra high temperature treatment).

1.53 It was in this context that the Chief Executive was notified (while in Europe) of these matters late on the evening of Thursday, 1 August 2013, and the Chairman was advised on the morning of Friday, 2 August 2013.

1.54 The events of Friday, 2 August 2013, included advice to Fonterra that the Ministry of Primary Industries (*MPI*) would soon be making a public statement, and advising Ministers and overseas regulatory agencies, about the WPC80 issues. This advice, and attempts to coordinate with MPI and with customers and also within Fonterra, meant that disclosure notices to the NZX and ASX, and consequent media releases, were finalised very late on that Friday evening and released after midnight.

Was this a crisis?

1.55 The need for Fonterra to trigger a precautionary recall in relation to a risk of *C.botulinum* contamination was, indeed, a "crisis". It was a time of "intense difficulty" (Concise Oxford English Dictionary); and it had "the potential to cause sudden and serious damage to [Fonterra's] … reputation, or bottom line" (see Appendix H – Hallman et al, "*Best Practices in Crisis Communications regarding Food Contamination and Foodborne Illness*"). .

Crisis management: preparation and communications

1.56 The topic of crisis management received considerable attention in the Inquiry team's work. Fonterra had in place risk management and crisis management arrangements. And it had very good people doing their best as the WPC80 crisis broke and grew and continued. But the Inquiry's conclusion is that there were deficiencies in the preparations for a crisis of this nature and scale, and (in particular) in Fonterra's communications.

1.57 The need for preparations for crises, including credible and relatively frequent simulations, is well understood in international business. Close to home, Air New Zealand was cited to the Inquiry on several occasions as exemplary in this regard. And it is an important aspect of a food products business. As noted earlier, while the WPC80 events were complicated because the immediately affected product was an ingredient, and the Inquiry has all the benefits of hindsight, the Inquiry is satisfied that better crisis management processes and planning within Fonterra, including rehearsals and a designated crisis (or incident) management team, would have made a substantial difference.

1.58 In the field of food products crises, appropriate communications are crucial. In this context, the Inquiry has commissioned an impressive piece of new work from Professor Bill Hallman and his team at Rutgers University, New Jersey, which outline best practices in food crisis communications (Appendix H). This original work offers valuable guidelines and lessons for not only Fonterra but other food products businesses.

Findings: what went wrong?

1.59 There can be no doubt that Fonterra suffered global reputational damage in August 2013. That was inevitable when headlines associated the Fonterra name with the terms "botulism" and "infant food".

1.60 It may be that Fonterra's reputation will recover completely over time, in part because the "precautionary product recall" was seen in most quarters to be the responsible course of action, and not least because of the confirmation that in fact the WPC80 lacked the suspected botulism toxin potential and it was a false alarm. Fonterra and the New Zealand Government can be expected to continue comprehensive efforts to remedy the reputational damage. But the passage of time tends to obscure detail and facts, leaving a vague and incomplete perception. It seems likely that "the Fonterra botulism scare of 2013" is a phrase that will be recalled in future years, and not to Fonterra's advantage.

1.61 All of which goes to emphasise the longer term seriousness of the WPC80 episode, and the legitimacy of two central questions for this Inquiry, most simply stated as:

- What went wrong (the contamination concern events, and Fonterra's responses)?
- What needs to be done to avoid a repetition?

1.62 This report addresses those questions in some detail by reference to the "narrative" of events and the "decision points" (i.e. where choices were made within Fonterra which contributed to the occurrence and scale of the crisis, and the effectiveness of the responses). Any summary involves some degree of simplification, but should assist a focus on the key points and lessons.

1.63 In summary, the primary "things that went wrong" were as follows:

(1) Fonterra did not include any SRC tests in relation to any of its production of WPC, notwithstanding its acceptance of SRC tests under at least one contract with a major customer to manufacture products utilising WPC80.

(2) Some errors of judgement were made in preparation for the reworking process applied to the relevant WPC80 batches at Hautapu.

(3) The standard pre-start up automatic cleaning regimes used by Fonterra plants required improvement.

(4) There was insufficient senior oversight of the crucial decision to engage AgResearch to test for *C. botulinum*.

(5) The commissioning, design and limits of the *C. botulinum* testing were inadequate.

(6) Fonterra was unable to promptly and definitively track the destinations of the affected WPC80 batches.

(7) There was only belated recognition (and delayed escalation to senior management and the Board) of the explosive reputational risk involved – a failure to "join the dots" between (a) *C.botulinum*, (b) infant food products, (c) consumer sensitivities, and (d) Fonterra's global reputation.

(8) Fonterra's crisis management planning, including the external communications aspects, was inadequate for a crisis of this kind and scale.

(9) Fonterra management of the crisis in the critical early period, including the external communications aspects, was not well executed.

(10) There was some lack of alignment and confidence between Fonterra and the New Zealand Government in the critical fortnight after the contamination concerns were advised to the Government and made public.

1.64 That is a substantial list of things that could and should have been done much better. It indicates that, in circumstances involving global reputational risk, and notwithstanding the high calibre of its people and most of what it does, Fonterra fell short of the expectations of excellence associated with a leading global nutritional products company.

What needs to be done to avoid a repetition?

1.65 Inevitably, a list of things to be done to avoid events and responses of a comparable nature will track those matters identified as having "gone wrong" in the context of the WPC80 crisis. These can be considered at both a practical level and a governance/culture level. Again, the risk of oversimplification should be kept in mind, as should the acknowledgements and reminders mentioned earlier.

Operational

1.66 In summary, and at a more or less operational level, the Inquiry considers that the primary "things that need to be done" by Fonterra are as follows:

(1) Ensure that Fonterra's specifications (and associated testing) for potential food quality and safety (*FQS*) issues across nutritional product ingredients manufactured for Fonterra are of "best in class" standard: consistent with the most rigorous requirements of customers, and with international best practice. (See Appendix E.)

(2) Develop and implement freshly considered procedures and criteria for reworking of product identified as unfit for intended purposes, consistent with customer expectations and international best practice. (See Appendix E.)

(3) Improve understanding of, and criteria for, change control procedures when any non-routine use is made of equipment used in relation to nutritional products and their ingredients. (See Appendix E.)

(4) Revise operational "cleaning in place" programmes to address the desirability of acid washes for pipes and equipment that have been unused for 24 hours or more. (See Appendix E.)

(5) Avoid use of flexible hoses in production processes, and particularly in processes involving nutritional products. Use of fixed stainless steel piping is preferable because it can be cleaned to a higher standard than flexible hoses. (See Appendix E.)

(6) Undertake a review into the use of bactofuges in particular product lines (e.g nutritional products) to assist with removal of potential contaminants from product. (See Appendix E.)

(7) Elevate FQS understandings and procedures to the same impressive levels as those for health and safety for all Fonterra personnel, through revised training, incentives and monitoring processes, and with consistent and conspicuous leadership from the directors and senior managers. (See Appendix E.)

(8) Overhaul the procedures for non-routine microbiological testing within Fonterra to ensure senior management oversight of proposals for low probability/high risk internal work, and that such proposals are thoroughly assessed in advance for utility and the full range of possible consequences.

(9) Establish a revised protocol for engagement of external scientific and diagnostic resources to ensure that any work commissioned is by institutions or practitioners of international standing, is appropriately undertaken for, and funded by, Fonterra (i.e. asking whether the proposed work is not better undertaken on a pan-industry basis), and that the analyses sought will yield results that are robust.

(10) Improve batch tracing systems across the Fonterra organisation to enable prompt and definitive product recalls to be undertaken at a "global best practice" level, including regular training and monitoring. (See Appendix F.)

(11) Clarify and emphasise risk management protocols for early escalation to senior management of potential reputational risks, especially in relation to FQS matters, including regular training and monitoring. This includes establishing a reporting line between the National Quality Manager and the Group Director Food Safety and Quality. (In turn, the Group Director Food Safety and Quality should directly report to both the CEO and the

Chairman of the Risk Committee: see Recommendation 27.) (See Appendix E.)

(12) Revise the crisis management arrangements across the organisation to "best in class", recognising that FQS reputational risks are likely to affect every market in which Fonterra has a presence (and differently). These arrangements should include regular and realistic simulations at least once (and preferably twice) a year involving stakeholders such as customers, industry associations, scientific experts and regulators, ensuring that lessons from exercises and earlier crises are applied and incorporated into an ongoing crisis readiness programme. These simulations should include scenario testing of international product recall procedures and high-level media engagement. (See Appendix F.)

(13) Establish a permanent (but not full-time) multi-disciplinary Incident Management team (*IMT*) whose members will be able to apply additional training, a regular and stakeholder-engaged crisis simulation regime and specialist experience to advise on and manage emerging issues, potential crises and realised new crises (and who will be linked in to the Food Integrity Council, the relevant Board Committee and other relevant parts of Fonterra). (See Appendix F.)

(14) Establish a Crisis Management Plan ("owned" by the proposed IMT) establishing best practice capability including: clear lines of command, highly-trained and credible spokespeople, use of dedicated IMT rooms on declaration of a crisis incident, template preparation (including backgrounders on all operating units and appropriate protocols for any likely crisis scenario such as a product recall, Q & A, timelines), "ghost" website readiness, social media strategy, third party endorsers, and translation and language capability in all markets. (See Appendix F.)

(15) Establish and sustain (with IMT oversight) protocols with key customers to enable the most effective responses to future critical incidents, including product recalls, with clear communication lines and constructive understandings about engagement with regulators and media. (Involving key customers in simulation exercises will also strengthen Fonterra's relationships with those customers.) (See Appendix F.)

(16) Establish and sustain (with IMT oversight) relationships with a pool of scientific experts in food quality and safety who can speak to the media and the public in the event of an incident. (See Appendix F.)

(17) Continue building a directly-employed strong, specialist and experienced communications team, including in key global markets, supplemented with contracted high calibre local expertise where appropriate. (This is in line with Fonterra's 2012 Communications Review recommendation, including advice from McKinsey & Co, and in part already acted upon.)

(18) Develop (through the communications team) a best practice "Master Communications Crisis Management Plan" aligned with the IMT's Crisis Management Plan, as well as template documents for all foreseeable scenarios, and capable of being adapted by regional offices for local market conditions and stakeholder requirements. (See Appendix F.)

(19) Develop a communications style and approach which better reflect Fonterra's values and aspirations as well as best practice risk communications, to enhance trust in Fonterra. (See Appendix F.)

(20) Conduct a systematic review of the quality of Fonterra's relationships with key stakeholders in all its markets to assist in enhancing trust and with effective management of any future critical event. (See Appendix F.)

(21) Consider the appointment of local advisory boards in each key foreign market to enhance capability, engage more sources of high-level advice and provide depth of knowledge of the politicians, regulators and opinion shapers. (See Appendix F.)

(22) Establish a best practice digital and social media strategy, including stand-alone elements in, and responsive to the needs and nuances of, each key market. (See Appendix G.)

(23) Enhance and sustain programmes for community investment, volunteering and giving as an investment in stakeholder engagement and goodwill.

Governance

1.67 At essentially a governance level, the Inquiry considers that the primary "things that need to be done" are as follow:

(24) The Board should explicitly endorse two unambiguous objectives as essential for Fonterra's future, and consistent with its cooperative ethos –

(a) a "one company" approach (with appropriate incentives, governance and management processes) to ensure that Fonterra as a whole performs consistently in the manner expected of a leading global food products organisation, and

(b) recognition of the paramount importance of Fonterra's global reputation, and the need to achieve and sustain a reputation second to none for the quality and safety of its food ingredients and products.

(25) The Board should explicitly accept responsibility for oversight of progress towards those objectives, including appropriate engagement with senior managers across the organisation, in particular with those managers responsible for championing the FQS imperatives.

(26) The Board should develop its own protocol for crisis management, including the roles of the Chair and the CEO; the means for ensuring that sufficient timely and accurate information is available for all directors to assess their regulatory obligations; and the expectations of directors' availability.

(27) The Board should transfer the Risk component of the Audit, Finance & Risk Committee's load to a separate Risk Committee, which should be expected to oversee the work of the proposed permanent Incident Management Team, with the expectation of direct engagement by the Committee with the leaders of that team.

(28) The Board should review the charter for its Co-operative Relations Committee with a view to ensuring that it gives greater prominence to establishing and sustaining relationships with key external stakeholders, not least those within New Zealand's government infrastructure.

(29) The Board should consider enhancing a programme of proactively developing and sustaining its acquaintance and relationships with Ministers, MPs, senior officials, overseas diplomats, industry allies and other "NZ Inc" leaders.

(30) The Board should develop and articulate an explicit position regarding the relevance (and, importantly, the limits) of Fonterra's "national champion" role in relation to Fonterra's aspirations, behaviours and relationships.

(31) The Board should encourage renewed investment by Fonterra to maximise the constructive collaboration with the New Zealand Government (including regulatory agencies), and the alignment between Fonterra's quality and commercial aspirations and the New Zealand Government's economic, food safety and diplomatic objectives and responsibilities.

(32) The Board should encourage investment by "NZ Inc" (including the NZ Government, Fonterra itself and other food products firms) in ensuring that New Zealand has pre-eminent scientific and diagnostic resources for FQS purposes.

(33) The Board should consider inviting the independent WPC80 Committee members, and the Inquiry team principals, to meetings in the third quarter of 2014 and again in the second quarter of 2015 to review Fonterra's responses to the Inquiry's recommendations.

1.68 This list of recommendations of "things to be done" is extensive, and (if implemented) would require a substantial investment of Fonterra leadership time and significant expenditure of time and money. While such costs are important, the medium term and long term imperatives are to make Fonterra much more resilient against future FQS and reputational risks.

1.69 The Inquiry is especially conscious that the role of the board is governance, not management, and that its recommendations will add to the burdens on directors. Nevertheless the Inquiry considers that these recommendations are important and will bring major and enduring benefits to Fonterra; and that

they involve an adjustment of governance focus, not an inappropriate interference in management.

1.70 It is appropriate for this independent Inquiry team to observe that the directors of Fonterra face time demands and stakeholder expectations that are probably second to none in New Zealand or Australian listed entities. Insofar as this Inquiry's proposals may add to those demands, that should be fairly recognised.

Management and change within Fonterra

1.71 On the topic of management, the Inquiry team heard from a number of executives that the frequency of organisational changes since the formation of Fonterra in 2001 has come close to engendering "restructuring fatigue". That has caused the Inquiry to pause before concluding that the "things that need to be done" include those which will require further changes to processes and organisational arrangements.

1.72 Nevertheless, the Inquiry considers that the changes it recommends are necessary to better secure Fonterra's future as new crises develop (as they inevitably will). It is beyond the scope, resources and timeframe of this Inquiry to specify precisely all the changes that are required. Plainly, changes in behaviours and culture will require appropriate leadership, monitoring and incentives. But further precision is better left to the careful and experienced consideration of Fonterra's management, with appropriate oversight by the Board, as is currently occurring in relation to the implementation of the Operational Review.

1.73 In the course of its work, the Inquiry heard from many interviewees on the topics of Fonterra's culture and reorganisations. The views expressed were not unanimous, and can be summarised (with the usual risks of oversimplification) as reflecting two divergent approaches to the management of a large business organisation.

1.74 One approach, associated with some earlier periods in Fonterra's history, favours a relatively high degree of autonomy for Fonterra's various Business Units (those with their own profit and loss reporting), and a focus on world class operational efficiency. This decentralised approach involves a less influential head office role, and a tendency towards consensus-seeking.

1.75 The other approach, associated with the current management era, has a much stronger central vision of Fonterra as "one company" with a need to move promptly to enhance and expand its role as a global food products organisation. This approach places a high value on a common and relatively centralised approach to business issues across the whole of Fonterra's operations. It is critical of Business Units operating as "silos" within Fonterra. And it enables a coherent corporate social responsibility programme to be developed.

1.76 This second and more centralised approach is now in the ascendant. A number of interviewees advanced or concurred with the suggestion that Fonterra is embarked on the second half of a "journey" from arrangements and culture reflecting the disparate legacies of the 2001 merger (mostly production focussed) to a fully integrated foods organisation (firmly customer focussed).

1.77 It is necessary to emphasise that the Inquiry was not designed, nor qualified, to articulate some kind of choice between these approaches. No such choice is necessary to understand the relevant events nor to recommend the steps that should be taken to strengthen Fonterra in the inevitable need to better manage future crises – potential or actual. But in fact the choice has been made, and its consequences reinforced by the WPC80 events. Its existence and significance is reflected in the objectives discussed in paragraph 1.67, above.

1.78 To be clear, the governance of a large corporation such as Fonterra involves the directors appointing a chief executive in whom they have trust and confidence, having oversight of the chief executive's appointment of the next tier of senior management, and overseeing the organisational structure and cultural objectives which management (led by the chief executive) propose as the best means of achieving the corporation's short-term and long-term objectives.

1.79 While the Inquiry is recommending some material changes in the light of the WPC80 events and responses, nothing in its examination of those events

and responses leads it to raise any question about the trust and confidence that the board has in the chief executive and the senior management team.

1.80 Further, the Inquiry is not recommending major changes to the organisational structure of Fonterra. It recognises that in any large organisation there is inevitably a balance to be struck between centralisation and delegation, and (as noted above) that the chief executive has a fundamental accountability for its success and hence a substantial discretion in shaping the structure of the organisation.

1.81 In this context, the Inquiry is inclined to agree with the observation by one interviewee, with significant senior management experience, that there is no structure that is perfect for any particular business – rather there must be a workable structure which is made to work well by the personnel, policies, practices and culture in place.

1.82 Finally, under this heading, it is worthwhile emphasising that the Inquiry's recommendations are made in the context of an organisation that is already operating at a high quality level in almost all respects. Thus those recommendations are essentially in the nature of incremental improvements, and consistent with Fonterra's pre-existing commitments to both food quality and safety and to continuous improvement.

Culture and relationships

1.83 The word "culture" was volunteered frequently in the Inquiry team's discussions about Fonterra with people within and outside the organisation. Others preferred to focus on "behaviours". But all were indicating the desirability of changes in the way that Fonterra personnel perceive and engage with their responsibilities and with external stakeholders.

1.84 For the most part, these references to "culture" related to the need for food safety and quality concerns to have an increased priority across Fonterra. The "cultural" benchmark is the increased consciousness achieved within Fonterra in relation to health and safety. As will be plain to readers of this report, the Inquiry endorses that aspiration and the associated recommendations of the recent internal Operational Review (see below, and Appendix J).

1.85 A separate set of comments to the Inquiry about culture related to escalation, in the context of decision-making. In particular, those comments reflected the well justified frustration that knowledge of the WPC80 issues arrived far too late at senior management and board levels. Insofar as the cultural objective here is the asking of pertinent questions about food safety or non-standard testing issues, including asking more senior personnel, the Inquiry agrees that this is essential, and that all Fonterra personnel should be encouraged (from induction) to consider their work in its wider context – to be able to "join the dots".

1.86 On the other hand, a simple emphasis on escalation may be a recipe for the avoidance of decisions and the responsibility of managers to make decisions. It is not practicable to be prescriptive about any particular balance between these factors, and others (including efficiencies). The objective will always be considered and intelligent decision-making, and discussion (including escalation) where there is doubt.

1.87 A further perception of "culture" within Fonterra that was conveyed to the Inquiry, mostly by those outside the organisation, was of self-centredness – that Fonterra is focussed on its own immediate interests and insufficiently concerned with the interests of, or relationships with, others. For any business, the neglect of stakeholders is probably unwise. For Fonterra, with its involuntary "national champion" status, such neglect is unquestionably unwise.

1.88 The larger the organisation, the harder it needs to work to ensure its stakeholder relationships are trusting and sustained, that it acts with transparency and credibility and it does not suffer from lack of responsiveness and accusations of being a "fortress". Based on the views put to the Inquiry by a large number of different stakeholders, Fonterra is not immune from this imperative. One of the most important steps Fonterra should now take is to use this opportunity to review both the substance and the style of its engagement with the people, organisations and communities that are important to

it, to re-establish trust and to build lasting, mutually-beneficial relationships.

(Internal) Operational Review

1.89 As most readers of this report will be aware, an internal WPC80 Operational Review was undertaken by Fonterra's senior management in August 2013, led by Maury Leyland. This work was summarised in a media release (dated 4 September 2013), and a in Summary document (dated 6 September 2013).

1.90 As noted earlier in this Overview, the board's independent Inquiry was not involved in the WPC80 Operation Review. However, it has of course discussed the WPC80 events with Maury Leyland, and has read the documents produced by that Review.

1.91 The Inquiry's conclusions have been reached independently of the Review and its conclusions. But it is unsurprising, and encouraging, that there is a significant degree of overlap and no substantial contradiction, between the recommendations of this Inquiry and that Review. In essence, the Inquiry endorses the initiatives described in the Operation Review work, and the progress already made on their implementation, but goes beyond them in its own recommendations. (See further, Appendix J.)

Communications team model

1.92 As has already been identified in the 2012 Review, Fonterra has an historic, strong and unusual dependence on a communications team model based on the services of one supplier, a firm with offices in NZ, Australia and Asia. In some areas, notably in farmer/owner communications and some areas of media relations, the skills and expertise of the contractors have served Fonterra well and the duration of the involvement has meant there is a deep knowledge and understanding of the co-operative. At times of peak activity, consultants have been able to be moved from other client work to bolster the Fonterra communications effort. This has lent flexibility to the arrangement.

1.93 As of 1 August 2013, a new Group Director, Communications, role has commenced at Fonterra and the staged enactment of the 2012 recommendations is in progress.

1.94 It is no coincidence that a Communications Team model which until recently was entirely outsourced is highly unusual among large enterprises with complex information needs. Fonterra's peer companies, including key customers, have communications teams who are employees. This means they can talk with authenticity for the company, commit the company to certain decisions, and are subject to the policies, performance management and obligations of employees. Lines of authority are clear. Immersion in company values is a given, as is an intimate knowledge of the company's business strategy. Together, these factors ensure that communications (internal and external) are consistent and co-ordinated.

1.95 The WPC80 incident put some of the drawbacks of a contractor model in sharp relief, including:

(a) Scope. The relationship is governed by a contract with the firm which specifies certain services in its scope. Activity tends therefore to be largely restricted to the scope specified in the contract. This means new and fast-emerging areas of communications, such as social media, have not been adopted with the vigour and speed that an internal team, unconstrained by a prescribed scope of works, is likely to have done.

(b) Dual accountability. While the Communications Team operatives seem highly committed to Fonterra, the fact is as employees (and in some cases, directors and shareholders) of the firm, and not of Fonterra, they also have accountability to

the firm, including to other clients. Though some of the consultants work full-time at Fonterra, others do not and their availability and focus can be curtailed by these other commitments.

(c) Authenticity. Even though some of the contractors have had long term involvement with Fonterra, the informed outside world is aware that members of the team are contractors and not "authentic" Fonterra employees who live and breathe the business. Particularly in times of crisis, it is important the authenticity of those conducting media and other relationships is unquestionable. "Spin doctors" can be (often unfairly) viewed pejoratively and their credibility can be even more challenged if communications operatives are not employees.

1.96 This is not to say consultants cannot and do not add significant value to communications efforts. Clearly they do. But they are best engaged to supplement, and not supplant, in house capability. They should be drawn upon strategically according to needs in particular circumstances, in particular markets.

1.97 Accordingly, the Inquiry endorses the continuation of the building of a directly-employed strong, specialist and experienced communications team, including in key global markets, supplemented with contracted high calibre local expertise where appropriate. (This is in line with Fonterra's 2012 Communications Review recommendation, including advice from McKinsey & Co, and in part already acted upon.)

Questions and answers

1.98 To explain and summarise its findings and recommendations, the Inquiry team has produced relatively concise answers to anticipated questions from the Board (and other likely readers). Readers will understand that such concise answers necessarily give a less detailed response to particular issues than can be found by a reading of the full report – in particular, the Narrative/Decision Points section and relevant Appendices.

1.99 For convenience, the Q&As are organised under the following headings:

A. The Board's Independent Inquiry – Overview
B. The WPC80 narrative (and some science) – pre-2 August 2013
C. The narrative (and the spotlights) – from 2 August 2013
D. The Fonterra Board
E. The Chief Executive
F. What the Inquiry didn't do
G. What happens next?

The questions

1.100 More particularly, the full list of questions is as follows:

A. THE BOARD'S INDEPENDENT INQUIRY – SUMMARY
Why was the Board's Inquiry established?
How was the Inquiry independent of Fonterra?
What are the Inquiry's main findings?
What are the Inquiry's main recommendations?
Were there any positives for Fonterra in the WPC80 narrative?

B. THE WPC80 NARRATIVE (AND SOME SCIENCE) – PRE-2 AUGUST 2013
Why did Fonterra advise the Ministry of Primary Industries (MPI) that there were potential food safety concerns related to its WPC80 product?
Were the consumers of products containing the relevant batches of WPC80 ever in fact in danger from C. botulinum?
What is WPC80?
What are SRCs, and where are they found?
What is Clostridia botulinum? And botulism? (And botox?)

If the relevant batches of WPC80 were produced in 2012, why did this issue only become public in early August 2013?
Why doesn't Fonterra routinely test all its products for C. botulinum?
Why were the relevant batches of WPC80 "reworked"?
What happened in the "rework"? (Was there a "dirty pipe"?)
Does the high SRC count for the affected WPC80 batches indicate problems with Fonterra's approach to hygiene in its plants?
If the high SRC counts were picked up by Fonterra in April 2013, why was no precautionary recall triggered until early August 2013?

C. *THE NARRATIVE (AND THE SPOTLIGHTS) – FROM 2 AUGUST 2013*
Why was the media release issued a few minutes after midnight?
Why did Fonterra look ill-prepared for the media questions?
Did Fonterra have a crisis plan?
Why didn't Fonterra know exactly where the product was on Day 1?
Why hadn't Fonterra developed a sophisticated social media strategy?
Why did the NZ Government appear to distance itself from Fonterra?
Fonterra's early messages seemed misplaced. In the first couple of days it did not seem to make it clear the recall was precautionary, it did not say sorry, and it was inconsistent in its tone – sometimes quite alarming, other times seeking to minimise. Why?
Did Fonterra's crisis management improve - after the first few days?
After the first few days, did Fonterra's crisis management improve?

D. *THE FONTERRA BOARD*
When was the Board first advised of the WPC80 issues? (Why not earlier?)
What could the Board have done earlier which could have influenced the WPC80 events and responses?
What recommendations by the Inquiry relate directly to the Board?
Why was the Chairman not a primary spokesperson for Fonterra when the WPC80 events became a matter of public and media focus?

E. *THE CHIEF EXECUTIVE*
When was the Chief Executive first advised of the WPC80 issues? (Why not earlier?)
What could the Chief Executive have done earlier which could have influenced the WPC80 events and responses?
What recommendations by the Inquiry relate directly to the Chief Executive?
Why was the Chief Executive not the primary spokesperson for Fonterra when the WPC80 events became a matter of public and media focus?

F. *WHAT THE INQUIRY DIDN'T DO*
Why did the Inquiry not recommend a stronger regulatory framework?
Why has the Inquiry not assessed the performance of various government agencies and personnel during the WPC80 events?
Why has the Inquiry not recommended that "heads should roll" at Fonterra over the WPC80 events and responses?

G. *WHAT HAPPENS NEXT?*
What will happen to the Inquiry's recommendations?
Will anything really change?

- The answers from the Inquiry

A. *THE BOARD'S INDEPENDENT INQUIRY – SUMMARY*

A1 *Why was the Board's Inquiry established?*
The Board considered that the unforeshadowed nature, global scale and reputational risk aspects of the WPC80 events and issues justified a thorough and independent inquiry. The inquiry would necessarily assess and be mindful of legal risks to Fonterra, and would also provide lessons to enable Fonterra to avoid, mitigate or improve its response to, any analogous circumstances.

A2 *How was the Inquiry independent of Fonterra?*
First, the Inquiry was given its own mandate to review the entire narrative of the WPC80 events and responses, including the acts or omissions of

the Board, management and of other Fonterra personnel. *Second*, the personnel involved in the Inquiry team, and a majority of the oversight Committee are neither employees nor elected directors of Fonterra. *Third*, the Inquiry proceeded without direction, monitoring or constraint by Fonterra's senior management.

A3 What are the Inquiry's main findings?
First, there were process errors in relation to the May 2012 rework of the relevant WPC80 batches (see Q [B9], below).

Second, there was a failure to properly escalate and engage with senior management levels before the June 2013 decision to commission external testing of an existing product for *C. botulinum* (see Q [B11], below).

Third, there were deficiencies in the scope and design of the commissioned external testing.

Fourth, there were weaknesses in Fonterra's risk management and crisis management processes in relation to product recalls (and, especially, batch tracing).

Fifth, those weaknesses were evident in Fonterra's responses to the AgResearch test results.

But, *sixth*, Fonterra had no choice but to advise the relevant agencies of those test results once it was established that potential health risk attached to product in the market.

A4 What are the Inquiry's main recommendations?
First, that risk management and crisis management processes be strengthened, including by establishment of a specially trained and multi-disciplinary (but not full-time) Incident Management Team and regular relevant training, global best practice product tracing systems, and a new Risk Committee of the Board.

Second, that reputational risk assessment form part of the criteria for escalation and assessment of non-standard external scientific tests.

Third, that the Board emphatically endorse the fundamental importance of food safety and quality in its aspiration for Fonterra's culture and its global reputation.

Fourth, that plant cleaning programmes be amended.

Fifth, that there be sustained efforts to address a "Fortress Fonterra" perception held by a material proportion of key stakeholders, by Fonterra redefining the style and substance of its engagement with them.

Sixth, that the Inquiry be reconvened after 9 months and again after 18 months to review Fonterra's progress on those recommendations.

A5 Were there any positives for Fonterra in the WPC80 narrative?
Some. There are valuable lessons in several areas which should improve Fonterra's food quality and safety culture and practices, and its risk and crisis management capabilities. The huge and exhausting efforts of large numbers of Fonterra personnel to assist with the responses to the WPC80 events illustrated the calibre and commitment of the people inside Fonterra. The fact of the early establishment of this Inquiry, and the cooperation it received (inside and outside Fonterra), has shown Fonterra's preparedness to face a full, thorough and independent review of its operations and culture.

B. THE WPC80 NARRATIVE (AND SOME SCIENCE) – PRE-2 AUGUST 2013

B1 Why did Fonterra advise the Ministry of Primary Industries (MPI) that there were potential food safety concerns related to its WPC80 product?
As a matter of ethical and statutory responsibility, Fonterra had to (and did) advise MPI, as the proper New Zealand regulatory agency, once it was clear that (a) that internal testing of three batches of WPC80 (see Q [B6], below) produced in 2012 had shown abnormally high levels of SRCs (see Q [B4], below), (b) external testing had identified the SRCs as likely including *Clostridia botulinum* (see Q [B11], below), and (c) these batches had been included in products being marketed for human consumption.

B2 Were the consumers of products containing the relevant batches of WPC80 ever in fact in danger from C. botulinum?
With hindsight, no. The very extensive August 2013 testing undertaken for the Ministry of Primary Industries established that the SRCs

which had been the subject of the earlier limited testing were not *C. botulinum*. These tests contradicted the more limited earlier testing undertaken for Fonterra.

B3 What is WPC80?

WPC80 is a grade of whey protein concentrate, a product extracted from whey and manufactured at several of Fonterra's New Zealand processing plants. The product has a range of uses as an ingredient in end-products, including health drinks and formulated foods.

B4 What are SRCs, and where are they found?

SRCs are a class of perhaps 200 different species of micro-organisms found throughout the world, and especially in soil. They are microscopic and almost everywhere, including the gut of every bird and animal. SRCs thrive in oxygen-free (anaerobic) environments.

B5 What is Clostridia botulinum? And botulism? (And botox?)

Clostridia botulinum is a relatively rare and frail species of SRC. However, in some circumstances, certain strains of *C. botulinum* can produce a very dangerous neurotoxin which may cause botulism – a flaccid paralysis of vital organs. In children and adults, *C. botulinum* cannot compete with the many (and necessary) other micro-organisms that reside in the gut. It is more problematic in the relatively unpopulated gut of babies and very young infants. (While the toxic effect of *C. botulinum* has been understood since the 19th century, its medical role – including relaxation of body tissues and muscles – has been developed in the late 20th century, including in the modern growth of a major market for botox products and treatment.)

B6 If the relevant batches of WPC80 were produced in 2012, why did this issue only become public in early August 2013?

The various products made by Fonterra undergo a range of tests (Fonterra's laboratories undertake 5 million tests every year). Some products are tested for SRCs before leaving the production plants but many are not. In particular, WPC had not been tested by Fonterra – nor, as the Inquiry understands, by other manufacturers – prior to June 2013. The high SRC counts in the relevant WPC80 batches (first made in February 2012 and reworked – see Q [B9], below – in May 2012) were first picked up in April 2013 after an end product manufactured by Fonterra in Australia for a major customer was found to have SRC levels in excess of the customer's contractual specifications.

B7 Why doesn't Fonterra routinely test all its products for C. botulinum?

There is no available "routine" test to identify *C. botulinum* in dairy processing. There can be (and is already) expanded routine testing for SRC levels, but identifying *C. botulinum* is very difficult – the most definitive tests still involve injection of test mice for mouse bio-assays. An August 2013 report by the International Union of Microbiological Societies (*IUMS*) explains that detection of *C. botulinum* is difficult, partly because of the numerous different strains which requires multiple different methods to detect. Furthermore, confirmation of toxin production requires mouse bioassays which not only raise ethical issues but also are not suited to routine food microbiology laboratories as special security and biosecurity precautions are required. There are only a limited number of specialised laboratories in the world that are able to do this work. And even then, mouse bioassays have drawbacks, including deaths related to causes other than *C. botulinum*.

Accordingly, the IUMS does not recommend routine testing for the pathogen (except for end product testing in the event of an outbreak in order to determine source). It does recommend testing for SRCs as an indicator of process hygiene.

B8 Why were the relevant batches of WPC80 "reworked"?

They were originally contaminated with a few small pieces of plastic. In February 2012, at Fonterra's Hautapu plant (in the Waikato region), during an examination of a large dryer in operation, a torch came into contact with part of the equipment, breaking the hard plastic torch lens. A few pieces of this plastic were not recovered and thus contaminated the WPC80. (For context, Fonterra produced over 30,000 tonnes of WPC80 in the 2011/2012 season; and 2,847 million tonnes of dairy products in total.) To maximise the value of this "foreign matter contaminated" WPC80, Fonterra personnel

proposed, and the external regulatory authority approved, the wet "rework" and filtration of the product to remove the "foreign matter" – that is, the remaining pieces lost from the broken plastic lens of the torch.

B9 What happened in the "rework"? (Was there a "dirty pipe"?)

The rework of the "foreign matters contaminated" WPC80 took place at Hautapu in May 2012, later in the dairy season. The "wetting" part of the rework, necessary to achieve the very fine filtration sought, was not a normal operation for WPC production and required some improvisation inside the scale-up facility (SCUF) and whey plants. This involved the use of much of the plant equipment (including many stainless steel pipelines) but also of one stainless steel pipe that had not been used for over two years, and two flexible hoses not used in the usual production processes. There is very strong circumstantial evidence, which the Inquiry accepts, that, despite two cleaning cycles being applied to the whole of the processing channel before the rework commenced, a film of micro-organisms (i.e., the SRC colony) had developed in the additional pipe and/or hoses, and survived the pre-operation cleaning processes. (Describing the rework process in terms of use of a "dirty pipe" was uninformative and practically misleading, if not careless.)

B10 Does the high SRC count for the affected WPC80 batches indicate problems with Fonterra's approach to hygiene in its plants?

No. The Inquiry concluded that Fonterra's approach to hygiene is consistent with what is expected of top quality food manufacturing operations internationally. The error of judgement involved was not related to any inadequate approach to hygiene, but did involve a departure from appropriate risk management processes for the improvisations developed for the wet reworking process.

B11 If the high SRC counts were picked up by Fonterra in April 2013, why was no precautionary recall triggered until early August 2013?

The precautionary recall was based on credible test results identifying *C. botulinum* as the likely high count SRC species in the affected WPC80 batches. Those test results were the mouse bio-assays, advised to Fonterra after midday on 31 July 2013 by AgResearch. After 3 April 2013, when Fonterra's Darnum (Victoria) plant tests linked high SRC levels in end product produced for a major customer with WPC80 produced at Hautapu, primary attention was given to four matters: whether the non-compliant product manufactured for Customer A would be downgraded (to cattle feed) – it was; whether Fonterra Australia would bear the cost of that downgrade – it was agreed to be split 50/50 with the NZ Milk Products business unit; whether there should be an SRC test added to the routine tests for WPC80 production – there was, effective 10 June 2013; and why the high SRC levels had occurred at Hautapu – this was linked to the pipe/hose improvisation.

Attention was also given to a fifth matter, the identity of the relevant SRC species. This was not initially perceived as either urgent or inevitable because of a strong belief (ultimately vindicated by the MPI commissioned tests later in August 2013) that it would not be *C. botulinum*. This belief reflected international dairy industry expectations (i.e. that *C. botulinum* has never been associated with milk-based powders), and the initial identification of the species as the essentially benign *C. sporogenes*. However, it was understood that *C. botulinum* is difficult to distinguish from *C. sporogenes*, and it was suggested that there would be merit in testing to eliminate any small possibility that the relevant SRC was not *C. sporogenes*. On 25 June 2013 there was the decision to fund such testing by AgResearch – which had some experience with *C. botulinum*, and had more appropriate resources than existed within Fonterra. Thereafter, the testing proceeded expeditiously.

C. THE NARRATIVE (AND THE SPOTLIGHTS) – FROM 2 AUGUST 2013

C1 Why was the media release issued a few minutes after midnight?

Once the test result came back indicating the potential presence of *C. botulinum* around midday on Wednesday, 31 July, Fonterra scaled up its response team from "critical event" to "crisis" and continued to assemble information so it knew as much as it could about the scale and scope of the issue. During the next 36 hours, it intensified its tracing and product identification,

contacted eight customers of potentially affected product and alerted the CEO, board, other senior management and, importantly, MPI. On Friday, 2 August, MPI advised Fonterra of its procedures and intention to advise Ministers, make public statements about potentially affected product in the NZ market and set in train notifications to foreign regulators. Fonterra worked internally and with MPI and others, to obtain the best available information to prepare announcements and ready themselves for the notifications, including to securities markets, but that process was not completed until just after midnight.

C2 Why did Fonterra look ill-prepared for the media questions?

Fonterra was hampered by contractual obligations with some of its customers which precluded it from naming them in event of an ingredient product recall. This was compounded by incomplete tracing data. Further, the belated escalation of the event meant contingency preparations for public communications which might have been made earlier were not made. This meant announcement and translation drafts, tailored stakeholder letters and rollout timetables, the enlistment of scientific experts, facts sheets and Q and As, a dedicated website, and robust interview preparations were not in place in ample time for the first media conference on Saturday morning, 3 August.

C3 Did Fonterra have a crisis plan?

Yes. It had crisis plans at business unit and group level, dating back in contemporary formats to at least 2006. They had been rehearsed from time to time at business unit level and Fonterra had participated in at least one group wide exercise in collaboration with MPI. However, the group plan had never been rigorously or regularly tested for one of the most likely risks to Fonterra, a global product recall, and the recommendations arising from a significant review of its performance during the crisis involving the withdrawal of dicyandiamide (*DCD*) – a nitrate inhibitor, tabled to Fonterra in May 2013 had largely not been acted on by the time the *C. botulinum* crisis arose.

C4 Why didn't Fonterra know exactly where the product was on Day 1?

This is a deceptively simple question. The relevant WPC80 "product" was an ingredient sold to and used by a range of Fonterra's commercial customers, in some cases received by them up to 12 months earlier than "Day 1" (i.e., than 1-2 August 2013). So knowing precisely where the product was would always involve some complexity, and firms other than Fonterra. Nevertheless, the Fonterra tracing systems and associated IT knowhow were proved to be sub-optimal – as explained in some detail in Appendix D.

C5 Why hadn't Fonterra developed a sophisticated social media strategy?

Fonterra's social media presence was largely limited to tweeting media releases. It does not appear Fonterra had given social media the priority that its scale and global footprint warrants in the second decade of the 21st century. This might be partly explained as a product of Fonterra's not keeping up with its own evolution to an increasingly B2C (business to consumer) enterprise, evolving as it was from a B2B (business to business) enterprise. (Generally, see Appendix G.)

C6 Why did the NZ Government appear to distance itself from Fonterra?

That is really a question for the NZ Government, but it seems clear there were frustrations at various levels within central government at Fonterra's early inability to provide timely and accurate product tracing information.

More generally, any government must give priority to food consumers' safety. In the early period of uncertainty (regrettably prolonged in this case by the ongoing tracing issues), any government could be expected to keep some distance between itself and a possibly culpable producer. Nevertheless, the NZ Government's actions and statements in such circumstances are quickly relayed and closely scrutinised by politicians, officials and media in overseas markets. This underscores the need for workable and constructive protocols between the NZ Government and food products exporters (not least Fonterra) to be in place before future "incidents", "alarms" or "crises" occur – as they almost inevitably will.

C7 Why did Fonterra's early messages seem confused?

In the first few days after the WPC80 issue became public, Fonterra did not seem to make it clear the recall was precautionary, it did not say sorry, and it was inconsistent in its tone – sometimes quite alarming and at other times seeking to minimise. The persistent adjustments to the estimates of affected product (see Appendix D) were corrosive of Fonterra's credibility with Ministers and officials.

There is a significant body of research and "best practice" knowledge on how to promote strong relationships and communicate during usual times, and in times of risk and crisis, so as to maximise trust and credibility. Fonterra's communications style and substance does not consistently demonstrate the characteristics of that knowledge. (See the valuable discussion by Professor Hallman and his team in Appendix H.)

C8 Did Fonterra's crisis management improve - after the first few days?

Yes. Within four or five days the crisis management team was better organised into governance and operational groups, the timeliness and quality of decision-making improved, co-ordination with regulators and customers was improving, the quality of information about the potentially affected product was better and Fonterra had applied significant resources to responding to questions and concerns from its stakeholders in all its markets. But, as Fonterra itself has recognised in its internal Operational Review, the deficiencies in the first 72 hours (24 to 72 hours being "the Golden Hours" in crisis management) cost Fonterra dearly. Generally, on perceptions of Fonterra's performance, see Appendix I.

D. THE FONTERRA BOARD

D1 When was the Board first advised of the WPC80 issues? (Why not earlier?)

The Chairman was first advised by the Managing Director of NZ Milk Products (*NZMP*) at 10.30am on Friday, 2 August 2013. The Chairman then contacted the chair of the Audit, Finance & Risk Committee and another member of that Committee (both were independent directors), and the chair of the Co-operative Relations Committee, and they were briefed in a telephone conference at 6.00pm. Other Board members were advised by an "Issues Monitor" from the NZMP Managing Director, e-mailed at around 10.00pm on Friday, 2 August 2013. A summary of the NZX/media statement was e-mailed to all directors at around 12.20am on Saturday, 3 August.

The first meeting of the full Board on the WPC80 issues was held by telephone conference on Sunday, 4 August 2013 from around 7.00pm. There were subsequent frequent Board meetings, by evening telephone conference, over the following fortnight or so.

(The Board should have been advised earlier that there were indications from AgResearch's testing that might involve a precautionary product recall and Fonterra's food safety reputation. The delay reflects the lack of timely escalation of the issue within Fonterra, in turn reflecting a failure to "join the dots" of (a) *C.botulinum*, (b) infant food products, (c) consumer sensitivities, and (d) Fonterra.)

D2 What could the Board have done earlier which could have influenced the WPC80 events and responses?

This question, more than many others, involves imposing hindsight. However, insofar as it is orthodox corporate governance theory that a board of directors should determine their company's appetite for risks relevant to its business, it appears that the Board had not, or at least not in a manner understood throughout the organisation, explicitly and unambiguouslyendorsed the paramount importance of Fonterra's global reputation, and the need to achieve and sustain a reputation second to none for the quality and safety of its food ingredients and products. The recommendations of the Inquiry would see the Board address those matters in terms of principle, committee structures and reporting lines.

D3 What recommendations by the Inquiry relate directly to the Board?

First, the Board should endorse explicitly as a core principle that Fonterra, as "one company", always strives to perform at the best practice level for leading global food product organisations. *Second*, the Board should similarly endorse the paramount importance of food

quality and safety to Fonterra's global and local reputation. *Third*, the "risk" component of the Board's Audit, Finance & RiskCommittee should be transferred to, and developed by, a separate Risk Committee. *Fourth*, the Board should accept greater responsibility for developing and maintaining relationships at the most senior levels of Fonterra's external stakeholders, including in government and media within and outside New Zealand. *Fifth*, the Board should actively review progress towards shedding the adverse "Fortress Fonterra" perception held by a material proportion of external stakeholders.

D4 Why was the Chairman not a primary spokesperson for Fonterra when the WPC80 events became a matter of public and media focus?

It was consistent with sound corporate governance for the crisis (including news media interest) to be dealt with by management, at Chief Executive level, rather than by the Board or its Chairman. The Board (and the Chairman) had not been involved earlier, and needed to preserve a little distance to deal later with management's performance. In the absence overseas of the Chief Executive in the initial days of public and media concern, it was a valid option for the crisis to be dealt with by the very senior and experienced Managing Director of NZMP, who had been chairing the crisis management meetings for several days – and the Chairman consulted on this topic. The Chairman took the lead in direct communications with the Shareholders Council, supplying shareholders and various other stakeholders. It would have been possible for the Chairman to have made some "shoulder to shoulder" appearances with the NZMP Managing Director, to emphasise Fonterra's efforts and commitment to do the right thing and perhaps explain the absence of (but regular telephone contact with) the Chief Executive. That was not the choice made at the time, even if hindsight suggests the alternative might have been better received by a number of stakeholders.

E. THE CHIEF EXECUTIVE

E1 When was the Chief Executive first advised of the WPC80 issues? (Why not earlier?)

In a telephone call from the Managing Director of NZMP at around 11.00pm, on Thursday, 1 August 2013 (NZ time). The Chief Executive was then in Europe because of a family bereavement. The following morning (Friday, 2 August), he directed that the NZMP Managing Director brief the Chairman urgently, and before notifying MPI. The Chief Executive maintained a high level of telephone contact with the Chairman and others thereafter until his return, via China.

(The Chief Executive should have been advised earlier. See Q [B11], above. Further, he had emphasised the need for prompt escalation of food safety issues in elevating the "learnings from the DCD issue" to the Board in late May 2013.)

E2 What could the Chief Executive have done earlier which could have influenced the WPC80 events and responses?

As noted in relation to the Board (Q [D2], above), this question involves a substantial imposition of hindsight. However, insofar as the narrative illustrates weaknesses in important aspects of risk management and crisis management procedures and performance, these occurred on the Chief Executive's watch. The weaknesses appear to have been inherited, but the Chief Executive had been addressing those in some initiatives, in particular in seeking to implement lessons from the DCD controversy earlier in 2013.

E3 What recommendations by the Inquiry relate directly to the Chief Executive?

None. But the recommendations by the Inquiry, other than those related directly to the Board, will require the active support of the Chief Executive if they are to be implemented and effective. A significant number of these are already work in progress because they are consistent with proposals in late August 2013 from the internal Operational Review set up by the Chief Executive.

E4 Why was the Chief Executive not the primary spokesperson for Fonterra when the WPC80 events became a matter of public and media focus?

Again as noted in relation to the Board (Q [D4], above), this question must be addressed in the context of (a) the Chief Executive being absent from New Zealand (because of a family bereavement in Europe), and (b) the existing involvement of the very senior and experienced NZMP General Manager. It was entirely

appropriate for the primary Fonterra spokesperson to be the most senior executive "on the ground" where information and advice from numerous sources was being collected, assessed and adjusted. The Inquiry team has heard widespread praise for the Chief Executive's decision to stop in China en route back to New Zealand, for his public statements and press conference in Beijing, and his actions upon his return. However, there is also widespread recognition that the lasting impressions of an organisation's performance in a crisis are usually set in the first 72 hours.

F. WHAT THE INQUIRY DIDN'T DO

F1 Why did the Inquiry not recommend a stronger regulatory framework?

The nature of the regulatory framework is a matter for the New Zealand Government. As this Inquiry could not require information and attendance by government agencies, that topic is appropriately considered in detail by the current Ministerial Inquiry (which has relevant statutory powers). However, on its analysis, and its comparison with overseas regime, this Inquiry considers the New Zealand regulatory architecture to be sound. Further, this Inquiry did not see the various cumulative factors contributing to the WPC80 narrative as having been compounded by any deficiencies in the regulatory framework. The Inquiry did see scope for significant and sustained investment in deepening relationships and confidence between Fonterra and both regulatory organisations and the New Zealand Government generally.

F2 Why has the Inquiry not assessed the performance of various government agencies and personnel during the WPC80 events?

First, basic principles of natural justice count against any assessment where the party to be assessed cannot engage fully with the assessors. That is the position with government agencies and personnel who generally have no direct obligations to Fonterra, but do have their own accountability and obligations under statute, or to Ministers. *Second*, there is a need for both Fonterra and government agencies to invest more (and more consistently) in improved relationships. This objective could only be damaged by this Inquiry seeking to judge those government agencies on incomplete information, then and reporting such judgements to the Board and more widely. *Third*, this is a topic eminently suitable for the Ministerial Inquiry.

F3 Why has the Inquiry not recommended that "heads should roll" at Fonterra over the WPC80 events and responses?

First, "heads should roll" is essentially a colloquial reference to termination of employment, and employment law issues are properly a management responsibility and involve questions of confidence, privacy and fair procedures beyond the scope of this Inquiry. (As it happens, the Inquiry has not identified any action where the relevant Fonterra personnel were not seeking to act in what they assumed were Fonterra's best interests.) *Second*, and to avoid any doubt, the Inquiry has seen no basis to suggest any review of the employment of the Chief Executive (see Q [E1] to Q [E4], above). *Third*, because the errors of judgement which might be attributed to individual employees are essentially the result of gaps in Fonterra's procedures and training. *Fourth*, because the most valuable and long term consequence of errors of judgement by employees is to be able to identify and fix gaps in Fonterra's procedures, training, structures and incentives.

G. WHAT HAPPENS NEXT?

G1 What will happen to the Inquiry's recommendations?

They will be presented to and considered by the full Fonterra Board. Insofar as the Board agrees, they may be published and will be implemented by the Board itself or by Fonterra's senior management. In particular, subject to the Board agreeing, Fonterra will be expected to report on progress on these recommendations to the Committee and the Inquiry team in 9 and 18 months' time.

G2 Will anything really change?

Yes. The Inquiry is confident that both the Board and the senior management of Fonterra have a strong and genuine belief that Fonterra must change (by making major operational improvements and re-evaluating its stakeholder relationships) in the light of lessons from the WPC80 narrative.

SECTION II: NARRATIVE AND DECISION POINTS

"Those who cannot remember the past are condemned to repeat it" – George Santayana *The Life of Reason* (1905)

2.1 An important part of the Inquiry team's work was to independently establish the sequence of events which led up to, and occurred during, the WPC80 crisis. In part, this "narrative" was relevant to the (privileged) legal risk assessment by the Inquiry team. But in part it provides the context for the key "decision points" – where choices had to be made within Fonterra. These in turn provide lessons which, if heeded, should assist in avoiding Fonterra's history repeating itself.

2.2 Accordingly, this section of the report comprises two parts:

- *First*, a "Narrative" – a substantial chronological summary of the sequence of relevant events, based on a range of documents and on the Inquiry team's confidential interviews. This highlights (by shading) the "decision points".
- *Second*, a "Decision Points" part – a discussion of the context and, in many cases, the calibre of the choices made which cumulatively created the WPC80 crisis.

The Narrative

2.3 The table below sets out a narrative to the key events which occurred in the lead up to, and during, the WPC80 crisis. It is a summary only – the Inquiry team was provided with full access to Fonterra's documents and reviewed a very large number of these. A full chronology would be extremely lengthy. The highlighted "Decision Points" are discussed later in this section of the report, and (in some cases) in the Appendices.

Date	Event
27 June 2004	Fonterra created whey protein concentrate (80%) (*WPC80*) product specification 104579. Specification 104579 contained no requirement for testing for Sulphite Reducing Clostridia (*SRC*).
~2008	Fonterra Darnum (Victoria) took over from Waitoa (Waikato) as primary supplier of nutritional base powder products to a major customer, used for infant formula (among other things). Fonterra Darnum began receiving WPC80 (specification 104579) primarily from Fonterra Hautapu (Waikato) for manufacture of nutritional base powders.
1 January 2011	A major customer entered into agreement for Fonterra to supply nutritional base powder products to that customer. That customer's powder products specifications included SRC requirements. No steps were taken within Fonterra to reflect those SRC requirements in pre-dispatch testing of any of the ingredients.
Decision Point 1 Non-integration of customer SRC specifications with NZMP WPC specifications	
2 February 2012	A foreign matter contamination occurred at Hautapu during the manufacture of WPC80, and in a busy part of the processing season. In the course of examining a dryer at Hautapu at the start of WPC80 production, a torch was sucked into the inlet pipe of the static fluid bed. The hard plastic lens of the torch was broken against the damper. At this time, a number of the larger pieces were recovered.

Date	Event
	Approximately one tonne of WPC80 had been produced at the time of contamination and the dryer was stopped, but it was thought that the fan clearance, radiator and static fluid bed would prevent any particles getting into the product, and the dryer was restarted. WPC80 production continued.
	Decision Point 2 **Continuation of WPC production run at Hautapu after torch incident**
3 February 2012	The following morning the incident was reviewed. It was determined there were two pieces of the lens missing. The dryer was stopped and an inspection was carried out. On the radiator, small particles were found which made up the equivalent of one of the pieces. The fan intake and fan outlet duct were then checked again and the missing piece was not located. The missing piece was wedge shaped, approximately 15x25mm. The static fluid bed, oven and sifter were also checked and no pieces were found. An exception report was raised. The report noted that "it is possible, but highly unlikely that the plastic will end up in the powder". The planned action was to "pack and put on hold powder".
13 February 2012	The Hautapu-based Quality Co-Ordinator drafted a product disposal request (*PD*) for review by the Protein Technical and Product Solutions Technical teams (responsible for managing the technical aspects of protein product manufacture – *Protein Technical*). The PD suggested the product be approved for its intended use, but to restricted markets (i.e. not for human infant consumption). As a back-up, approval was also sought to: • reclassify the product to another specification; or • dispose of the product to stockfood.
19 February 2012 (approx)	Protein Technical approved the PD.
20 February 2012	The PD was sent to the Regulatory Authority (AsureQuality) as PD2550 (version 1) for approval.
16 March 2012	AsureQuality rejected PD2550 (version 1) – that is, declining approval for intended use in restricted markets and stated: "*you may now need to reconsider other product disposal options, e.g. further processing*".
	Decision Point 3 **Lodging and rejection of PD#1 for reworking of Hautapu batches**
16 March 2012	The Quality Co-ordinator notified the process manager that PD approval had been rejected, and asked what the plant would like to do with the product.
23 March 2012	Written proposal for a wet rework process through a drier feed filter when the Scale-Up Facility (*SCUF*) plant (plant number 1282) was on a drier wash. The proposal was copied to the SCUF plant manager and the site manager.
26 March 2012	Protein Technical agreed with the suggested wet rework proposal.
29 March 2012	The Quality Co-ordinator raised a Corrective Action/Preventive Action plan (*CAPA*) to prevent another instance of plastic from a torch contaminating the product. (The CAPA was carried out on 17 October 2012 by adding a grate to the end of the fan to prevent a torch from falling in.)
30 March 2013	The Quality Co-ordinator submitted PD2550 (version 2) to AsureQuality. "*Approval is sought to wet rework this product at Hautapu factory 1239. Product to be filtered*

Date	Event
	through a 300mm filter then evaporated and dried".
11 April 2012	AsureQuality approved reprocessing of product "in a Fonterra plant (1239) where it will undergo filtration". It also approved the product for stockfood. (Note: Plant 1239 is the whey plant adjacent to Plant 1282, the SCUF plant)
	Decision Point 4 **Lodging and approval of PD#2 for reworking of Hautapu batches**
~27 April 2012	Some members of the Hautapu team went on leave, and their roles were undertaken by others in the interim.
2 May 2012	A draft rework plan was prepared on the basis of hydrolysate rework plans. Hydrolysate rework was not infrequently undertaken in plant 1282. Wet WPC80 rework had not previously been undertaken. The wet rework process required the product to be reconstituted in the SCUF plant (1282) and then sent to the Whey plant (1239) for evaporation and drying. As identified in the plan, the product would be transported from the SCUF plant to the Whey plant via the ad hoc use of the "MF retentate line" and two flexible hoses. The rework plan did not address the fact that the MF retentate line had not been used for approximately two years prior to the WPC80 rework. It also did not address the necessary cleaning procedures. There was discussion of section 3.5 (Rework controls) of the Fonterra Standards of Excellence, and ensuring that the plant had considered each point under section 3.5 and that the documentation accurately recorded what they would do. AsureQuality was not asked to approve the rework plan (in contrast to the usual practice).
	Decision Point 5 **Omission of Change Control procedure for Hautapu reworking**
	Decision Point 6 **Set up of reworking process with ad hoc pipeline arrangement**
~13 May 2012	Selection of flexible hoses to be used in WPC80 wet rework.
~13 May 2012	Connection of flexible hoses and MF retentate line.
13 May 2012	Caustic 'clean-in-place' process (*CIP*) was completed. The process used was the ordinary, day-to-day process for cleaning pipes, including pipes not used for extended periods. (Note: May is a relatively quiet period in the milk processing season.)
17 May 2012	Second caustic CIP was completed.
	Decision Point 7 **Choice of pre-reworking cleaning processes (without acid wash)**
17-22 May 2012	Rework was completed in several runs over successive days. A daily CIP was performed during the rework process. Three cyphers (individual batches given their own code for tracing purposes) of WPC80 were produced – JW17, JW18 and JW22 (the "affected" WPC80). (Subsequent tests revealed high SRC levels for each of the cyphers.)

Date	Event
22 May 2012	Return from leave of some Hautapu personnel.
July 2012-February 2013	37.8t of affected WPC80 was sent to customers, including: • 13.5t to Altona, Victoria, to be used by Fonterra Darnum in production of nutritional base powders for a customer; • 3.6t to Waitoa, to be used in production of nutritional base powders; • 20.7t was sent directly to customers for use in products such as UHT beverages.
24 January 2013	MPI and fertiliser companies Ravensdown and Ballance Agri-Nutrients issued statements about traces of the agricultural chemical dicyandiamide (*DCD*) being found in milk and a voluntary suspension of sales.
24 January 2013	Article entitled "Is New Zealand milk safe to drink," referring to DCD traces, appeared in Wall Street Journal, triggering global media coverage.
18 March 2013	Testing carried out as part of the manufacturing of nutritional powders at Darnum showed elevated SRC levels for some of the final product. Some, but not all, of the product was outside specification for the customer.
21 March 2013	Darnum began an investigation into the high SRC levels. The initial focus was on whether high SRC levels were caused by the raw milk. Darnum's Technical personnel asked a microbiologist at each of the Food Assurance team at the Fonterra Research and Development Centre in Palmerston North (*FRDC*) and Clandeboye (South Canterbury) about a potential connection between the raw milk and the elevated SRC in the final product.
22 March 2013	Those microbiologists advised Darnum that the high SRCs were more likely to have been caused by an ingredient, rather than raw milk. One of the microbiologists advised that he would not discount any of the ingredients as a risk factor, but had no knowledge of whether WPC does have, or has been known in the past to have, high SRCs.
22 March 2013	Darnum asked the NZ Technical Account Management team (responsible for liaising with customers on development of product specifications and about product quality, among other things) to commission urgent testing by Fonterra's laboratories of the JW17 and JW18 WPC80 cyphers to verify elevated SRC levels.
1 April 2013	"Go-live" date for switchover from JD Edwards enterprise resource planning system to the SAP system in Australia (*JDE*).
3 April 2013	NZ Technical Account Management sent the test results from Fonterra's laboratories to Darnum. Test results demonstrated presence of *C. sporogenes* and *Bacillus Licheniformis* as dominant organisms.
3 April 2013	Darnum's technical manager circulated the test results internally. Results showed that the WPC80 was the source of the high SRCs in the final product, with SRC levels in JW17 being approx. 7000 to 8000 cfu/g.
9 April 2013	Darnum asked FRDC to test the SRCs to establish whether or not the organisms were *C. perfringens*. (Their customer had (and continues to have) a *C. perfringens* specification requirement when high SRCs are present.) Darnum considered that the further testing would assist in convincing the customer to accept the product.

Date	Event
11 April 2013	FRDC sent Darnum a pre-release summary of their report. Tests confirmed the samples contained *C. sporogenes* and *Bacillus Licheniformis*.
11 April 2013	FRDC concluded SRC tests on the JW17 and JW18 samples. Results showed high SRC counts.
15 April 2013	FRDC sent Darnum a full test report. Darnum replied that "*the information that the SRCs are largely Clostridium sporogenes is valuable for discussions with our customer*".
17 April 2013	Darnum asked the NZ Technical Account Management team to commission microbiologists to do further testing and strain identification of the SRCs. Darnum also asked for confirmation that: • there was no appreciable presence of *C. perfringens* in the WPC80; • SRCs were predominantly *C. sporogenes* as found in the final product; • the dendrogram of the *C. sporogenes* was equivalent to that found in the final product, providing further evidence that the WPC80 is the source of the issues. Darnum was contemplating a claim against NZMP on the basis that the WPC80 was not fit for purpose. Darnum asked for these further tests to strengthen its case that the WPC80 was the source of the high SRCs in the final product.
Decision Point 8 **Darnum preparations for financial claim on NZMP for Hautapu WPC80 batches' quality (excess SRC levels – without breach of specification)**	
Decision Point 9 **Darnum request that FRDC investigate the Hautapu SRC beyond identification of origin**	
18 April 2013	NZ Technical Account Management Team told Darnum that the additional testing had been approved. Darnum asked whether a decision had been made on the inclusion of SRCs in the WPC80 spec.
25 April 2013	Darnum and their customer had a conference call to address the SRC issue. Darnum provided the customer with the SRC levels of all products proposed to be sold. The customer quoted its microbiologist expert as explaining that "*the main concern behind the SRC spec is the infant botulism which is caused by toxinogenic strains like C. botulinum, C barati and others. This is a risk for infants younger than 1 year of age, so a number over specification is not acceptable for IF and FO.... It might be acceptable for GUM but needs to be investigated deeper...*".
26 April 2013	Darnum asked the customer for a conference call with the customer's expert microbiologist. Darnum's view was that tests indicated the SRCs were *C. sporogenes* and not a threat to food safety, but offered to do any further testing required by the customer. (Note: no discussion with the expert took place.)
29 April 2013	FRDC received samples of JW17 and JW18 to test for confirmation of colony identity and to compare WPC80 results to nutritional powder blend results.
2 May 2013	Paper provided to FMT by Managing Director Co-Operative Affairs reporting on "*learnings from the DCD issue, the findings of a review undertaken by Internal Audit, and to outline a food safety escalation process designed to provide visibility of emerging food safety issues*".
7 May 2013	FRDC asked AgResearch how Fonterra could test to differentiate between *C. sporogenes* and *C. botulinum*, which are genetically similar. AgResearch suggested polymerase chain reaction (*PCR*) tests and mouse bioassay tests (*MBA*).

Date	Event
8 May 2013	FRDC told Darnum that: • the *C. sporogenes* identified in the WPC80 had similar typing patterns to the *C. sporogenes* in the final product; • the *C. sporogenes* are similar to *C. botulinum*, which carries a toxin gene. Inquiries were being made if AgResearch could do tests for presence of the toxin gene. *"Unfortunately, nothing in microbiology is simple. So, you should also know that a C. botulinum is simply a C. sporogenes without* [sic "with"] *the toxin gene. This being the case we are checking out whether AgResearch (at Massey University) can assay for the presence of the toxin gene. It is EXTREMELY UNLIKELY that these organisms, which Maldi [an analytical tool] identifies as C. sporogenes, are carriers of the toxin gene. We certainly don't want to be alarmist. However, we would be derelict in our duty if we did not consider the possibility."*
9 May 2013	Darnum asked to discuss high SRC levels in WPC80 with the Hautapu site manager and plant manager.
10 May 2013	Darnum sent a summary of the WPC80 issue to the Hautapu site manager and plant manager. The summary set out details of the complaint, the testing done, the cost of the complaint, the product affected, tracing of the product and test results.
15 May 2013	NZMP Quality and Technical prepared a product assessment paper considering the high SRC levels in Hautapu's WPC80. The paper noted abnormally high test results and recommended adding an SRC requirement into the existing specification, at a rate of 1/cypher.
20 May 2013	FRDC sent to Darnum its WPC80 SRC investigation and testing report. The key findings were: • The dominant Clostridium species isolated from the Darnum nutritional powder blend and the Hautapu WPC80 was *C. sporogenes*; • The presence of large numbers of *C. sporogenes* stimulated the question about whether they might pose a health risk to infant consumers. Clostridium experts have stated that strains of the pathogen *C. botulinum* Group 1, which are unable to produce toxin, are referred to as *C. sporogenes*; • Although the risk appeared to be low, the FRDC recommended that representative isolates of the *C. sporogenes* from the nutritional powder blend should be screened for the ability to produce the *C. botulinum* toxin (at AgResearch in Palmerston North at ~$2000/sample). The alternative was to withdraw the product in question from the infant food chain.
24 May 2013	FRDC followed up with Darnum about the recommendation that AgResearch screen the *C. sporogenes* in the base powder produced by Darnum for their ability to produce the *C. botulinum* toxin.
25 May 2013	Darnum told FRDC that it did not want to proceed with testing: "*All product affected by this incident [i.e product over a contractual SRC specification] has been rejected by [the customer] and has been withdrawn for sale as either stockfood or edible disposal for general populations. That is, all product has been withdrawn from the infant food chain. Based on this I cannot justify proceeding with the screening work to confirm that the C sporogenes are non toxin-producing*".
28 May 2013	Copy of FMT paper (of 2 May) provided to Fonterra Board reporting on "*learnings from the DCD issue, the findings of a review undertaken by Internal Audit, and to outline a food safety escalation process designed to provide visibility of emerging food safety issues*".

Date	Event
Decision Point 10 **Non-escalation (in April/May) of suspicion re *C. sporogenes* (i.e. of low risk/high consequence *C. botulinum* discovery)**	
Decision Point 11 **Limited work on tracing Hautapu WPC80 batches in May/June/July (consequence of non-escalation)**	
29 May 2013	Darnum reiterated its claim (first made on 9 and 10 May) against NZMP and Hautapu, on the basis that high SRC levels in WPC80 caused ~440 tonnes of nutritional products to be downgraded to stock food. Asked for claim to be reviewed and endorsed (or otherwise) by the following Monday.
30 May 2013	FRDC circulated its report into SRCs to Darnum staff, and provided a list of questions for discussion: • What are the most likely causes for the elevated levels of SRCs? • Could the level of SRCs seen in the Hautapu WPC80 have occurred without some form of process failure? • Are there any other hygiene indicators that should have alerted Hautapu to a problem given that SRCs were not tested in the specification? • Is there any question about the linkage between the Hautapu WPC80 and nutritional base powder results (i.e. that Hautapu WPC8D was the direct cause of the downgrade)? • Despite SRCs not being in the specification, is it reasonable to state that product was unfit for purpose?
2 June 2013	NZMP declined to accept Darnum's claim, noting that the product was manufactured against a general trade WPC specification, which does not list SRCs as a requirement. The plant did not know it was to be used for nutritional products.
6 June 2013	Darnum told NZMP that Fonterra Waitoa also did not have an SRC specification for WPC80.
7 June 2013	The Managing Directors of NZMP and Fonterra Australia agreed to split costs of the Darnum-Hautapu claim 50:50.
7 June 2013	NZMP's Director Operations asked NZ Quality and Technical to review Waitoa ingredient specifications (including for WPC80) before the new season started.
10 June 2013	NZ Quality and Technical asked the personnel within Head of Nutritionals Technical and NZMP's Product Range and Alignment team to check whether WPC80 for nutritionals applications is either tested before use or if there is a dedicated infant formula ingredient specification with SRC testing included.
11 June 2013	The Head of Nutritionals Technical delegated the WPC80 specification review to Nutritionals Technical team (based in the Waitoa laboratory (Waikato)).
12 June 2013	One of the product specifications for WPC80 - product number 104579 - was changed to include SRC testing. The change was explained as an interim measure while the option for a dedicated infant formula WPC80 was being considered.
13 June 2013	Nutritionals Technical emailed Darnum for information on work done by Darnum on the WPC80 issue and the outcomes.
14 June 2013	Nutritionals Technical team provided an internal update on work done. The summary identified that, among others, the following tasks still needed to be done: • a further review of NZ-based nutritional products which use WPC80 as a raw material (from both NZ and global source), checking what WPC80 specifications are used, if they have limits already in place and clearly identify the risks and mitigation plan;

Date	Event
	• determining if the affected batch of WPC80 from Hautapu had been used in any nutritionals products in NZ.
17 June 2013	Nutritionals Technical had an initial discussion with FRDC on the WPC80 issue. Key points: • Under normal manufacturing conditions (i.e. compliance with Hazard Analysis and Critical Control Points (*HACCP*), GMP, PS RMPS) elevated levels of SRC should not be a concern; • Given the manufacturing process of concentrated whey products, if product does become contaminated, spore forming bacteria will survive and be present in the final nutritional product. No reference made to any testing of WPC80 or product using WPC80.
18 June 2013	Nutritionals Technical asked Hautapu staff to confirm the cyphers of affected WPC80 that came from Hautapu, and any others that were affected. Hautapu staff confirmed that JW17, JW18 and JW22 were all manufactured at the time of the rework.
18 June 2013	Nutritionals Technical asked Waitoa plant staff to identify whether the contaminated WPC80 had been used in recent production at Waitoa. "*It is definitely important to identify these batches and if they have been used [Waitoa Drier 3] so we can put a plan in place if they have been used*."
19 June 2013	Waitoa plant staff confirmed that JW17 was used in production in January and March 2013. Nutritionals Technical concluded that the products made by customers with the contaminated WPC80 were: • "Growing Up Milk Powder" (*GUMP*) base powder; and • "Follow-on" (*FO*) powder. (Note: GUMP and FO are for use by older infants – babies would use "Infant Formula" (*IF*).)
20 June 2013	Darnum sent to Nutritionals Technical: • a summary of Darnum's complaint against Hautapu, dated 10 May 2013; • the FRDC report on the investigation of SRC contamination of powders received by Darnum, dated 20 May 2013 (which recommended screening tests be performed by AgResearch to eliminate the existence of *Clostridium Botulinum* in final product).
20 June 2013	Nutritionals Technical told FRDC that the products using the contaminated WPC80 were GUMP and FO.
20 June 2013	Nutritionals Technical emailed FRDC recapping an earlier discussion: • Nutritionals Technical planned to test affected nutritionals products for SRC and *C. perfringens*; • If SRC results were high, a decision would have to be made on toxin testing. FRDC responded with some observations from the Darnum experience, including: "*Although the risk appears to be low, the Food Assurance team [at FRDC] does not have the expertise to make a call on the likelihood that the C. sporogenes strains in the nutritional powder blend will be toxigenic. Therefore, for this particular case (Darnum) we recommended that representative isolates of the C. sporogenes from the nutritional powder blend be screened for the ability to produce the C. botulinum toxin*".
20 June 2013	Nutritionals Technical team prepared a review paper on the WPC80 contamination issue.

Date	Event
	The paper recommended, among other things: • Implement SRC and *C. perfringens* testing on identified nutritionals products made at Waitoa which used affected WPC80 from Hautapu in January and March 2013. If SRC levels were high, toxin testing would be appropriate (in accordance with the FRDC 20 May report); • Create a nutritional products specific NZ sourced WPC80 specification with an SRC limit of 100 cfu/g; • Ensure that globally sourced WPC80 specifications also contain both SRC and *Bacillus Cereus* limits, and ensure that general purpose WPC specifications were not used in nutritional products.
20 June 2013	Nutritionals Technical suggested initiating toxin testing at the same time as the SRC testing "*to ensure we quickly gain background on any potential risk".*
23 June 2013	Waitoa plant staff confirmed that Waitoa had manufactured approximately 257MT of product containing WPC80.
Decision Point 12 Continued non-escalation based on assumption that there was a very low risk that AgResearch tests would indicate the presence of *C. botulinum*	
25 June 2013	Nutritionals Technical explained the WPC80 investigation "at a high level" to the General Manager NZ Quality and Technical. Nutritionals Technical would provide update when outcomes of any testing become known.
25 June 2013	Nutritionals Technicals told FRDC to proceed with testing of the NZ manufactured product to confirm the presence of SRCs and *Clostridium Perfringens*. Toxin testing (i.e. to identify C. botulinum) to take place in parallel.
Decision Point 13 Decision to add *C. botulinum* testing of Hautapu batches to (a) SRC spec setting process, and/or (b) tests for compliance with customer contract specifications	
Decision Point 14 Non-involvement of (a) Director of Research, Science, Technology and Development, and/or (b) international expert, and/or (informally) MPI, at any time prior to AgResearch test results being received	
25 June 2013	FRDC internal update confirming that: • the potentially affected end products were being tested at NZMP's laboratory at Te Rapa for SRCs and *C. perfringens*. • the FRDC had been asked to arrange testing at an external laboratory for botulinum toxins in these end products.
26 June 2013	FRDC asked Nutritionals Technical to send the cost centre information for the toxin testing so that they could complete an agreement with AgResearch.
Decision Point 15 Selection of AgResearch (and no other testing agencies) to undertake tests for *C. botulinum*	
27 June 2013	Nutritionals Technical confirmed the instruction to FRDC to conduct toxin testing, and told FRDC that "Nutritionals" was the relevant cost centre for the AgResearch fee.
27 June 2013	Nutritionals Technical asked Waitoa laboratory staff to send samples of each of the affected

Date	Event
	cyphers to FRDC for testing.
28 June 2013	Technical Team Lead – Central North Island reported to NZMP on review of Hautapu WPC80 serious event. The work streams of this technical review included a plant investigation, optimisation/supply investigation and complaint escalation investigation. Conclusions reached included that SRCs were not included in specification material; the affected batches were 100% rework; and that the complaints process was followed but the complaint was not escalated correctly due to an incorrect initial valuation of the product.
2 July 2013	FRDC received samples from Waitoa for testing.
2 July 2013	Nutritionals Technical prepared an updated SRC contamination review paper. Update included confirmation that testing of 3 cyphers of end product had been initiated (including toxin testing), but no results as yet.
3 July 2013	Nutritionals Technical received SRC and *C. perfringens* test results from the Te Rapa laboratory for the two cyphers of product manufactured at Waitoa. Results indicated high SRC levels.
8 July 2013	FRDC provided preliminary test results to Nutritionals Technical: • SRC colonies which were isolated were very similar to those isolated from Darnum product, suggesting the WPC80 was the source of the high SRCs; • Key isolates were being taken to AgResearch for testing for toxin genes. If toxin genes are found "*then we have an answer*"; • "*If no toxin genes then next week the representative material will go to Hamilton for mouse bioassays - if dead mice then we have an answer - If no dead mice then we have an answer*". FRDC confirmed that they may receive a positive, but not a negative, toxin result later that week.
12 July 2013	Nutritionals Technical confirmed that agreement has been reached for creating a specific WPC80 for nutritional products, to replace the "104579" WPC 80 product. Further thought to be given to what limits should be tighter, in addition to SRCs.
12 July 2013	Nutritionals Technical staff prepared the final SRC contamination review report. The final recommendations were to: • create a NZ Milk Nutritionals WPC80 specification with an SRC limit of 100 cfu/g; • complete the clostridium toxin investigation to determine food safety risk on 3 affected batches of nutritionals products made in Waitoa; • create a specification for global sourcing of nutritionals WPC80 and enriched WPC with appropriate microbiological specification.
12 July 2013	Nutritionals Technical advised the General Manager NZ Quality and Technical in relation to the toxin testing that there is "*no serious risk here, purely precautionary*".
15 July 2013	WPC80 specification change request for WPC80 and WPC80 product sent from Nutritionals Technical staff and NZMP Product Range to the Alignment Manager.
Decision Point 16 Non-communication with MPI re *C. botulinum* testing at any time before AgResearch test results received	
18 July 2013	FRDC updated Nutritionals Technical about the toxin testing. AgResearch had completed testing but would not release results until Fonterra and AgResearch signed the testing contract.
18 July 2013	Fonterra and AgResearch signed the testing contract.

Date	Event
19 July 2013 at 1.24pm	FRDC emailed Nutritionals Technical with preliminary results (following Fonterra/AgResearch contract signing): • the tests indicated the SRCs were more comparable with *C. botulinum* than with *C. sporogenes*; • A mouse bioassay test would be required to confirm the absence/presence of *C. botulinum*. FRDC asked whether Fonterra had tracked all the whey powder in question, irrespective of whether it had been used as an ingredient or was still in WPC form.
19 July 2013 at 2.19pm	Nutritionals Technical received FRDC's update, and queried whether anyone in the NZ Quality and Technical team had done the product traceback.
Decision Point 17 **Lack of intensive tracing work across organisation immediately after initial advice from AgResearch that there were signs of inconsistency with *C. sporogenes* assumption**	
19 July 2013	FRDC confirmed to Nutritionals Technical that: "*If this test is positive it implies that our contaminant is not a C. sporogenes but a C.botulinum and pose a potential food safety risk for infants… If the test is negative we have to progress towards the FDA method (bioassay) to validate the organism as C. sporogenes*".
20 July 2013 at 8.54am	Nutritionals Technical escalated the matter to General Manager NZ Quality and Technical. General Manager NZ Quality and Technical referred Nutritionals Technical to discuss the issue with the NZMP Quality and Compliance Manager. The decision to escalate event to "critical" would be made once organism species and counts were known.
21 July 2013	Nutritionals Technical were asked to confirm: • that the contaminated WPC80 was only in the three cyphers identified and no others; • whether there was any nutritional base powder still in stock; • the current whereabouts of the three cyphers in the supply chain.
22 July 2013	FRDC sent Nutritionals Technical an update from AgResearch: • The product isolates tested negative for botulinum neurotoxin genes A, B, E and F (which strains are known to be fatal to humans); • Preparation of the extracts for the further mouse bioassay testing should be completed within the next 24 hours.
22 July 2013	Nutritionals Technical prepared a summary of testing of the affected WPC80.
22 July 2013	Nutritionals Technical approved cost of transporting toxin extracts to Hamilton for mouse bioassay test.
22 July 2013	FRDC discussed implications of testing with Nutritionals Technical.
22 July 2013	Nutritionals Technical conducted traceback of affected product to Canpac. No affected stock left at Canpac apart from a few bins that failed other specification tests.
22 July 2013	NZMP Managing Director formed a "Critical Event Team" (*CET*) to manage the WPC80 issue. At the time believed to be very low risk ("*95% chance it's not botulinum*"). Communications Team member (from Fonterra's external communications provider) was notified by Critical Event Team Manager that a CET had been formed. No detail of nature of event was provided. Discussions of process and protocols of involving the Communications Team in a critical event followed.

Date	Event
23 July 2013	Nutritionals Technical asked Fonterra Reporting Analysts to identify where all cyphers of affected WPC80 went, and to trace product domestic and overseas containing WPC80 if possible. Incomplete trace back results were provided later that day. Nutritionals Technical asked for clarification about whether results included movements to Fonterra stores and factories.
24 July 2013	Reporting analysts provided further tracing detail to Nutritionals Technical.
26 July 2013	CET "pre-crisis meeting", including General Manager Risk Management (but excluding any members of the Communications Team) took place. Discussion around whether to escalate the 'critical event' into a 'crisis' took place. Product would not be confirmed non-pathogenic until 5 August. Noted that *C. botulinum* is very uncommon in New Zealand and there were no reported cases of *C. botulinum* in powders causing food poisoning. Communications Team member was included in distribution of minutes of this meeting (12.17pm). On-forwarded to two other Communications Team members.
Decision Point 18 **Decision by Communications Team to "track issue closely". No decision taken to begin preparation for communications elements of potential product recall**	
26 July 2013 (4.30pm)	CET conference call to discuss and confirm option to progress. Final decision made to put product in Fonterra's control on hold. Customers not to be contacted until 5 August test result confirmation (decision to be reviewed on 31 July) because: • investigation completed using isolates from the Darnum nutritional powders and source WPC80 indicated the dominant strain of Clostridia was *C. sporogenes;*results of further toxin gene testing done to rule out the presence of botulinis toxin genes were negative; • the *Clostridia* results for the tested base powder ranged from 1-340cfu/g (comprising of individual results of 1, 5, 8, 42 & 340cfu/g). Therefore the typical result was highly likely to be below the 100cfu/g limit for infant formula; • the Clostridia levels in all final powders were considered low, indicating a low level of contamination; • *C. botulinum* was very uncommon in New Zealand, with no reported cases of infant botulism and only two adult cases botulism caused by ingestion of 'home pickled' mussels; • the overall risk for botulinum in dairy powders in New Zealand was considered very low.
28 July 2013	AgResearch began mouse bioassay.
29 July 2013	WPC80 specification change was put on hold until after the SAP August blackout. SRC testing, NO_2 testing and "no rework" requirements were added to the specification.
29 July 2013	Communications Team member checked on progress of testing.
30 July 2013	AgResearch told FRDC that one isolate tested had some toxic effect on a mouse, but wanted to confirm results. Further results expected on 1 August 2013.
30 July 2013	FRDC asked AgResearch whether they could test whether the toxin was a human pathogen, and how long that test would take.
30 July 2013	Fonterra Board was briefed on, and adopted, resolutions regarding (among other things) Financial Year 2014 dividend policy, an estimated FY14 dividend announcement, and FY14 earnings guidance. (Note: The Board was unaware of any WPC80 issues.)

Date	Event
Wednesday, 31 July 2013	AgResearch sent test results to FRDC. One strongly positive result for toxin – mouse died.
31 July 2013	FRDC notified NZMP management of positive toxin result – this triggered the formation of the "Crisis Management Team" (*CMT*).
31 July 2013	CMT met for the first time, chaired by NZMP Managing Director. Attended by personnel from the 26 July meeting. No Communications Team member was invited to attend. A number of work streams were commenced in order to determine whether the product affected was isolated to the WPC80 itself and the product made using the relevant WPC80. CMT agreed that once the information had been collated, each customer concerned would be contacted to ascertain whether the product was still within their control (for example, within their warehouses) or in the consumer market.
Thursday, 1 August 2013	First day in new role of Fonterra Group Director, Communications.
1 August 2013	Hautapu's Quality Co-ordinator completed an internal trace back and root cause investigation into the WPC80 contamination.
1 August 2013 (3.00pm)	CMT meeting. Communications Team member invited and attended. Key action points: • communications approach to external parties, internal parties, customers and NZX to be agreed; • social media to be monitored; • powerpoint presentation on contamination issue distributed to CMT; • level 7 Room A nominated as Command Centre. CET finalised briefing notes and technical advice to be used when contacting the Ministry of Primary Industries (*MPI*) and affected customers.
1 August 2013 (4.30pm)	Phone call scheduled with MPI for briefing was rescheduled until 12.00pm 2 August because relevant personnel were unavailable.
1 August 2013 (5.00pm – 8.30pm)	Communications Team included other key team members in first briefing on potential contamination and recall procedure.
1 August 2013 (6.43pm)	Darnum advised CMT members that they were checking the details of the product and volume of product affected. The status of affected stockfood was being determined with any stock still in control of Darnum to be put on hold. Darnum expected to be able to provide a summary of affected product by 7.30pm NZ time. Darnum also advised they would need to speak to Australia's Department of Agriculture, Forestry and Fisheries (*DAFF*) and Dairy Food Safety Australia (*DFSA*).
1 August 2013 (8.45pm)	Darnum advised the CMT that a total of 582MT of powder was implicated.
1 August 2013 (10.30pm)	NZMP Managing Director briefed the CEO (in Europe for family bereavement) on the crisis.
Friday, 2 August 2013 (12.00am)	Eight customers identified as having received product directly affected by contaminated WPC80 batches, including two infant nutritional customers, three beverage companies and three stockfeed companies. CMT began contacting customers believed to have been sent affected product.

Date	Event
2 August 2013 (8.00am)	Communications Team prepared "Issues Monitor" – a background document to be used by the CMT.
2 August 2013 (8.30am)	FMT conference call regarding annual results took place. Discussion on recall continued with CEO (in Europe), Group Head of Communications and Head, Investor Relations. CEO advised he would go directly to China.
Decision Point 19 Limited instructions/assistance re SAP to expedite tracing complexities associated with JD Edwards to SAP platform change during period of Darnum use of Hautapu WPC80 batches	
2 August 2013 (10.00am)	CMT met with CET, as well as key Fonterra personnel. **[Note: This meeting and all subsequent CMT meetings traversed a wide range of issues relating to the crisis. This narrative merely notes the fact of those meetings.]**
2 August 2013 (10.30am)	NZMP Managing Director provided a high level briefing to the Chairman. It was agreed that a later briefing would be provided, when more information would be available, and extended to the Chairs of each of the Board's Co-operative Relations Committee, and the Audit, Risk and Finance Committee, and another independent director. NZMP Managing Director called the office of the CEO team to ensure that a member of that team took part in the CMT.
2 August 2013 (c.11.30am)	Preliminary report from AgResearch received: all Fonterra samples were shown to be toxigenic; the Fonterra isolates were likely to be *C. botulinum* as shown by the level of similarity seen in the DNA fingerprinting analysis and from the results of the mouse bioassay.
2 August 2013 (12.00pm)	The FMT had a pre-planned meeting at Fonterra's office in Auckland. At the end of the meeting, the FMT discussed the potential contamination and recall issue.
2 August 2013 (12.00pm)	Fonterra briefed (by telephone) MPI, AsureQuality, DAFF and DairySafe Victoria of the positive result for *C. botulinum* in three batches of WPC80.
2 August 2013 (12.35pm)	Fonterra sent MPI WPC80 SRC investigation report, following earlier phone briefing.
2 August 2013 (1.15pm)	MPI advised Fonterra that it will revoke their health certifications for the products if the products were found to be within the NZ market.
Decision Point 20 Notification of MPI after AgResearch advice on mice testing	
2 August 2013 (2.30pm)	CMT meeting.
2 August 2013 (3.00pm)	Second call with MPI. MPI told Fonterra that it had notified the relevant Minister and would be informing the relevant Embassies once Fonterra had further information as to where the affected product had gone. MPI had decided that it would be making a public statement in the "next 12 hours" but agreed to coordinate with Fonterra on this.
2 August 2013 (4.00pm)	CMT meeting.
2 August 2013 (4.00pm)	Communications Team began drafting media release for announcement of a product contamination and recall. Approval process consisted of Group Director, Communications, Investor Relations,

Date	Event
	NZMP Managing Director, Board representatives, CEO (where available) and Legal.
2 August 2013 (6pm)	Briefing by telephone by NZMP Managing Director – for Chairman, Chair of Audit, Risk and Finance Committee, Chair of Co-operative Relations Committee, and another independent director.
2 August 2013 (6.22pm)	MPI urgently requested: • Fonterra's Product Risk Assessment; • Timeline and details for testing; • Bacterial strain and toxin type details. Fonterra provided documents by 7.01pm.
2 August 2013 (7.40pm)	Although not a direct customer of the affected product, Fonterra contacted their largest customer to inform them of the issue, as they "*were particularly affected by the DCD issue*".
2 August 2013 (8.00pm)	MPI advised Fonterra that it would be briefing the relevant Embassies and then issuing a public statement in the next 12 hours. As it had already been agreed that this announcement would be coordinated with Fonterra, the CMT then hastened to finalise the information to be released publicly, and decided it would be appropriate to also lodge the release with the NZX.
2 August 2013 (9.55pm)	Directors not previously briefed receive first advice of WPC80 – an e-mail attaching a two page "Issues Monitor" document from the CMT.
2 August 2013 (late evening)	It was decided that Fonterra would hold a media conference the following morning (Saturday, August 3) at 10.00am, prior to MPI holding its own conference. The NZMP Managing Director was selected as the spokesperson for Fonterra. The Communications Team updated the Issues Monitor document and began drafting supporting documents for the media conference: • Q&A • Briefing document for NZMP Managing Director • Media list
2 August 2013 (11.50pm)	Fonterra NZ was advised that the WPC80 product had been used by a customer in Infant Formula.
2 August 2013 (11.53pm)	Email from Darnum to NZ Crisis Team which advised that Darnum had identified more uses of WPC80 which could potentially increase the implicated product by 100 to 200 tonnes.
Saturday, 3 August 2013 (12.20am)	Media release lodged with NZX – *Fonterra Advises of Quality Issue*, and issued and distributed to directors, key stakeholders, including staff.
3 August 2013 (1.00am)	Further (stockfeed) customers were advised of the issue.
3 August 2013 (c.9.00am)	Farmer Update issued.
3 August 2013 (9.30am)	CMT meeting.
3 August 2013 (9.40am)	NZMP Managing Director was briefed for media conference and ran through Q&A.

3 August 2013 (10.00am)	MPI media release: *MPI exploring food safety issue advised by Fonterra Friday afternoon* – "The Ministry for Primary Industries is working closely with Fonterra on a food safety issue with a range of products manufactured from whey protein concentrate produced at a single New Zealand manufacturing site in May 2012."
3 August 2013 (10.00am)	Fonterra held a media conference fronted by NZMP Managing Director. The media conference was difficult, primarily because Fonterra was unable to name affected customers. That set off a significant wave of global media coverage.
3 August 2013 (12.00pm)	CMT meeting.
3 August 2013 (2.45pm)	MPI Director General statement under the Animal Products Act 1999 and the Food Act – "*At 12.35pm on Friday 2 August, Fonterra notified the MPI of a food safety issue involving three batches of whey protein concentrate produced at a single NZ manufacturing site in May 2012."*
3 August 2013 (4.00pm)	MPI Food Safety announcement "*Details announced of one product potentially affected by whey protein contamination*."
3 August 2013 (7.00pm)	Some members of the CMT dialed in to a conference call initiated by Fonterra Policy Director to determine 'next steps' following the public announcement.
3 August 2013 (8.30pm)	CMT meeting.
3 August 2013 (10.00pm)	Fonterra released a statement regarding Fonterra branded products, following public speculation / distress over which products were "contaminated". MEDIA RELEASE – *Fonterra Confirms None of its Branded Consumer Products Affected by Quality Issue*
3 August 2013	Darnum trace back identified 1,551.2MT of potentially affected product.
Sunday, 4 August 2013 (9.30am)	CMT meeting.
4 August 2013	Fonterra released further product information to the media. • MEDIA RELEASE – Fonterra Confirms NZAgBiz Recall • MEDIA RELEASE – Urgent Product Recall • MEDIA RELEASE – Fonterra provides reassurance on products from Coca-Cola, Wahaha and Vitaco
4 August 2013	Media update held.
4 August 2013 (10.35am)	Farmer Update and message from CEO to staff issued (by email of Chairman).
4 August 2013	Fonterra's President of the Greater China and India division deferred enquiries from Chinese regulatory authorities and government, as well as enquiries from media, pending resourcing of relevant communications staff.
4 August 2013	Darnum trace back identified 1,709.4MT of affected product.
4 August 2013 (2.15pm)	Current affected product status: 712.7MT (New Zealand product) and 4229 cartons at Customer B.
4 August 2013 (7.00pm)	Fonterra Board meeting. **[Note: This meeting and all subsequent Board meetings traversed a wide range of issues relating to the crisis. This narrative merely notes the fact of those meetings.]**

4 August 2013	CEO met with NZ Ambassador to China.
4 August 2013 (8.30pm)	CMT meeting.
Decision Point 21 Underestimation of potential scale of reputational risk, and overseas regulatory/government responses, to *C. botulinum* publicity	
Monday, 5 August 2013	Darnum trace back identified 1,693.1MT of affected product.
5 August 2013	Fonterra's website updated with new information for the first time since Friday, 2 August 2013. The only staff with access to the website were not employees and were not working over the weekend of 3-4 August 2013.
5 August 2013 (10.00am)	CMT meeting.
5 August 2013	Fonterra released further product information to the media. • MEDIA RELEASE – Fonterra Receives MPI Update on Exports to China • MEDIA RELEASE – Correction of Karicare Formula
5 August 2013	Farmer Update issued. Media update held.
5 August 2013	Website updated with information on WPC80 issue and microsite design begins. Fonterra Chinese language website based in NZ and outsourced.
5 August 2013	Fonterra staff in NZ began translating and preparing documents for release in China due to several requests for more information.
5 August 2013	CEO met with NZ Ambassador to China and China Food and Drug Administration (*CFDA*).
5 August 2013	Media conference held by CEO in China.
5 August 2013	Communications Team began to manually monitor publicly available social media posts. Communications Team determined that there were no direct messages or "questions specifically asked to Fonterra" so did not engage in Twitter conversation.
5 August 2013 (5.00pm)	Current affected product status: 845.7MT (New Zealand product) and 1,695.9MT (Darnum product).
5 August 2013 (7.00 p.m.)	NZMP Managing Director appeared on TV3's *Campbell Live.*
5 August 2013 (7.30pm)	Current affected product status: 930.7MT (New Zealand product) and 1,695.9MT (Darnum product).
Tuesday, 6 August 2013	MPI auditors visited Darnum to observe trace back process.
6 August 2013 (12.00pm)	Current affected product status: 746.1MT (New Zealand product) and 1,693.1MT (Darnum product).
6 August 2013 (6.00pm)	SRC Governance Group meeting (following separation of CMT into Governance Group and Project Group).
6 August 2013 (6.30pm)	Current affected product status: 882.4MT (New Zealand product).

6 August 2013	Farmer Update. Message from CEO to staff issued (8.18pm). Media update held.
Wednesday, 7 August 2013 (10.00am)	Current affected product status: 872.3MT (New Zealand product).
7 August 2013 (3.00pm)	Fonterra held a media conference fronted by CEO, who had just returned to New Zealand. MEDIA RELEASE – *Conclusion of SRC Investigation* MEDIA CONFERENCE – *CEO sorry for anxiety caused* Key message was that stocks were back in control of customers or on their way back – if consumers had any doubts about products they should return them.
7 August 2013	Farmer Updates, Media update held.
7 August 2013	Fonterra's Technical Manager Global Milk Sourcing conducted a review of the Hautapu trace back and root cause investigation into the WPC80 contamination.
7 August 2013 (7.00pm)	SRC Governance Group meeting.
7 August 2013 (8.00pm)	Current affected product status: 872.1MT (New Zealand product).
Thursday, 8 August 2013	Fonterra released further product information to the media. MEDIA RELEASE – *Fonterra Welcomes NZ Government's Confirmation of Safety of NZ Dairy Products* MEDIA RELEASE – *Fonterra Board to Conduct Formal Independent Review* FARMERS – TV UPDATE – the Chairman, CEO and Chairman of the Shareholders' Council update farmers on quality issue relating to WPC on Sky Channel
8 August 2013	Farmer Update. Message from CEO to staff issued (9.51am). Media update held.
8 August 2013 (6.00pm)	New Zealand trace back complete. Final product status: 837.5MT.
8 August 2013 (6.15pm)	SRC Governance Group meeting.
8 August 2013 (8.00pm)	Board meeting.
Friday, 9 August 2013	The Chairman and CEO met with senior Government Ministers.
9 August 2013	Fonterra released further product information to the media: MEDIA RELEASE: *Fonterra confirms no health risk with high school project*
9 August 2013 (6.30pm)	SRC Governance Group meeting.
Saturday, 10 August 2013 (6.00pm)	SRC Governance Group meeting.
10 August 2013	Farmer Update. Message from CEO to staff issued (8.31pm).
Sunday, 11 August 2013	WPC Issue – Senior Management Update.

11 August 2013 (6.00pm)	SRC Governance Group meeting.
11 August 2013 (7.00pm)	Board Meeting. Meeting to establish WPC80 Inquiry Committee.
Monday, 12 August 2013	MEDIA RELEASE: *Fonterra Board establishes WPC80 Inquiry Committee* MEDIA RELEASE: *Fonterra's Group Director of Strategy to lead the recovery management team that is responsible for the ongoing operations of the precautionary recall and will oversee the operational review.*
12 August 2013	Farmer Update. Message from CEO to staff issued (9.30am, 1.13pm).
Tuesday, 13 August 2013	MEDIA RELEASE: *Fonterra confirms no affected product sent to Russia*
13 August 2013	WPC Issue Senior Management Update
13 August 2013 (7.45pm)	Board Meeting.
Wednesday, 14 August 2013 (11.00am)	First meeting of WPC80 Inquiry Committee and Inquiry team.
14 August 2013 (1.15pm)	Board Meeting.
14 August 2013 (5.20pm)	NZX/MEDIA RELEASE: Managing Director of NZ Milk Products Resigns
14 August 2013	Farmer Update. Message from CEO to staff issued (5 pm).
Thursday, 15 August 2013	MEDIA RELEASE: *Further Appointments Made to Fonterra Board's WPC80 Inquiry as Committee Gets Underway.*
15 August 2013	Message from CEO to staff issued (2.20pm).
Friday, 16 August 2013	MEDIA RELEASE: *Fonterra places two senior managers on leave, effective immediately, as it continues its internal operational investigation into the circumstances surrounding the recent precautionary recall of WPC.*
16 August 2013	Farmer Updates, Message from CEO to staff issued (5.49 pm).
Saturday, 17 August 2013 (12.00pm)	Board Meeting.
Sunday, 18 August 2013	Australian trace back complete. Final affected product status: 1,757.5MT.
18 August 2013	MEDIA RELEASE: *Fonterra has confirmed that it has received notification of a temporary injunction to prevent it selling its products in Sri Lanka*
Note: the more detailed part of this narrative ends with events up to Sunday, 18 August 2013. The balance of the narrative is much more selective and ends with Fonterra making public the results of its internal OperationalRreview	
Monday, 19 August 2013	MEDIA RELEASE – *Fonterra welcomes NZ Government's confirmation that it will conduct a joint ministerial inquiry into WPC incident*

	MEDIA RELEASE – *Fonterra Refutes Sri Lanka Temporary Injunction* MEDIA RELEASE – *Fonterra Australia Confirms No Consumer Products in Australia Affected by Quality Issue*
Tuesday, 20 August 2013	MPI Media Release: *MPI exploring interim measures for dairy sector to strengthen consumer assurances around New Zealand's dairy production.*
Wednesday, 21 August 2013	MEDIA RELEASE – *Additional Quality Assurance Underway at Fonterra Plants*
Sunday, 25 August 2013	MPI Tracing and Verification Report states that MPI is confident that all affected product has been adequately traced and managed.
Wednesday, 28 August 2013	NZX/MEDIA RELEASE: *Fonterra Seeks Clarification from MPI* Fonterra has made a formal and urgent request to the MPI to release initial results received from additional testing that was commissioned by MPI following Fonterra's precautionary recall earlier in the month. NZX/MEDIA RELEASE: Fonterra Resumes Sri Lankan Operations
28 August 2013	MPI received results confirming that the bacteria found in the WPC80 manufactured by Fonterra is not *C. botulinum*. MPI Media Release: "Negative WPC tests confirm no risk to public"
28 August 2013	Media Release: Fonterra Relieved About 'All Clear' From *C. botulinum*
28 August 2013 (5.00pm)	Media Conference Message from CEO to Staff (8.30pm), Farmer Update
Thursday, 29 August 2013	MPI Media Release: *No food safety risk from Karicare products* - The Ministry for Primary Industries (MPI) has confirmed that, on the basis of information to hand, there was never a food safety risk associated with any Karicare products made with whey protein concentrate (WPC).
Saturday, 31 August 2013	MPI releases report detailing the full diagnostic results of the whey protein concentrate (WPC) tests. The tests have come back negative for *C. botulinum*. The organism is confirmed as *C. sporogenes*. It is therefore not capable of producing botulism-causing toxins.
Wednesday, 4 September 2013	MEDIA RELEASE: *Fonterra has announced the findings of its operational review.* The precautionary recall was not the result of any one single cause, but was rather the result of a number of separate and unrelated events occurring in an unforeseen sequence.

The Decision Points

2.4 The following part of the Inquiry's report is intended to be read in conjunction with the preceding "Narrative and Decision Points" table. It elaborates on parts of the narrative set out in that section, and provides some context for, and some explanation of the options available to Fonterra, at each relevant decision point. It is consciously concise, but a number of significant topics are elaborated in the Appendices.

Decision Point 1
Non-integration of customer SRC specifications with NZMP WPC specifications

2.5 Whey protein concentrate (80%) (*WPC80*) is used in a variety of nutritional products, including (but not limited to) infant formula (0-6 months), Follow-On formula (for children of 6 to 12 months) (*FO*), and Growing Up Milk Powder (1 to 3 years old) (*GUMP*).

2.6 WPC80 is processed in a number of factories within Fonterra's New Zealand Milk Products (*NZMP*) business, such as Hautapu, and then sent to other factories (such as Darnum, Victoria) to be used in the production of specific nutritional base powders for customers. In some cases, it is also shipped directly to customers for use as an ingredient in sports drinks.

2.7 WPC80 is produced in accordance with particular specifications for ingredients and testing (physical and microbiological). A number of WPC80 specifications exist. The main WPC80 specification is the "general trade" specification (WPC80/3295), which is described as a general trade ingredient intended for the general population. Other WPC80 specifications state that they are intended for use in a wide variety of nutritional products for infants and adults. SRC testing was not part of any of the WPC specifications.

2.8 Fonterra Darnum produced (and continues to produce) nutritional base powders for infant formula for a customer. That customer's specification for the infant formula powder requires Darnum to test the end product for SRCs, and if high SRC results are found, to test for *C. perfringens* (associated with food spoilage).

2.9 The WPC80 produced by Hautapu was one of the products used by Darnum in producing the infant formula powder for the customer, at a low percentage level. Darnum also occasionally used WPC80 made by other Fonterra sites.

2.10 Despite the customer's SRC level requirements in its specification, Darnum did not require NZMP to test WPC80 for SRCs or *C. perfringens*. The reasons for that lack of testing at the ingredient production level included the following:

- there had been no issues with SRCs in WPC80s historically, so there was considered no need to test;
- if there were any significant SRC issues in the product, they would get picked up in a final product testing at Darnum; and
- given the small proportion of WPC80 being added to the product, the general view was that there would need to be serious issues with SRCs in the WPC80 to cause the final product sent to the customer to be out of specification.

2.11 The Inquiry considers that the lack of correlation between Darnum customer requirements and NZMP ingredients testing was a significant departure from best practice. It commends the prompt implementation of an interim SRC testing regime for WPC within NZMP from June 2013.

Decision Point 2

Continuation of WPC production run at Hautapu after torch incident

2.12 Approximately one tonne of WPC80 had been produced at the time of the broken torch lens contamination. The Hautapu plant team was notified of the contamination and the drier was stopped. The view was taken at the time that any particles would not get into the product, and so the decision was made to continue production, and the drier was restarted.

2.13 At next morning's Daily Management Systems meeting, the plant team reviewed the incident, and determined that there were two pieces of the lens missing. The dryer was stopped again. By this time, approximately 40 tonnes of the WPC80 had been produced, all of which potentially had been compromised. No other products were affected because this was the final run of the season, and the plant was shut down and given a full clean in the following weeks.

2.14 It would have been possible to end the production run immediately when the torch broke, and to dispose of the one tonne of WPC80 product produced at that time. The dryer could then have been cleaned before the process was restarted the following day. That precautionary option should have been (but was not) taken. The failure to do so triggered a series of events which cumulatively brought about the precautionary recall.

Decision Point 3

Lodging and rejection of PD#1 for reworking of Hautapu batches.

2.15 The Hautapu plant team concluded that there was a possibility of the plastic ending up in WPC80 powder and that this constituted a food safety issue. The plant turned its mind to how to dispose of the product in question. The Hautapu view in the first instance was to ask the Regulatory Authority (*RA*) for approval to supply the product for its intended use, but to restricted markets. The proposed restricted market was not set out in the Product Disposition (*PD*), but the Hautapu team explained that the intention was to market the WPC80 for use in products but on terms indicating that it was not suitable for infants. The rationale was that even if a piece of plastic were to get through the screening process used in WPC production, it would not adversely affect an adult given its minute size.

2.16 Other options were to reclassify the product to another specification, or to dispose of the product to stock food immediately.

2.17 Seeking approval to use the product for its intended use, but in restricted markets, is not in itself an unusual request for disposal. There are a range of instances where this occurs, and there are many different ways of "restricting" the market (for example by restricting the product to customers with re-processing facilities, or restricting the product to certain end-consumers). The Hautapu plant genuinely thought that supply to restricted markets was an appropriate disposal option for the potentially contaminated WPC80 in the circumstances. It was not seen as a request out of the ordinary.

2.18 The RA rejected the application for approval to supply the product to restricted markets for its intended use. No written reasons for the rejection were given, and Hautapu staff do not recall any reasons being given verbally. The Hautapu quality team advised that they could not recall any other instance of the RA rejecting a PD. Had the application being approved, there would have been no occurrence of the later events which culminated in the precautionary recall.

2.19 The RA suggested that Hautapu consider other disposal options, such as further processing. This prompted the subsequent wet reworking proposal by Hautapu, which was approved and undertaken.

Decision Point 4

Lodging and approval of PD#2 for reworking of Hautapu batches

2.20 Following on from the rejection of PD#1, the Hautapu plant personnel considered reworking the WPC80 through the plant. Although hydrolysate rework was a common occurrence, WPC80 rework was not.

2.21 The proposed rework process was a wet rework through a drier feed filter when the Scale Up Facility (*SCUF*) plant (plant number 1282) was on a drier wash. That was the same process for rework of hydrolysate. However, because the WPC80 required a drying step (not needed for hydrolysate), the WPC80 would have to be transferred to the immediately adjacent whey plant (plant 1239).

2.22 That suggestion was approved by the Hautapu Protein Technical team, a team tasked with development of protein products and processes.

2.23 No discussion took place at this time about how the WPC80 would be transferred from the SCUF plant to the whey plant. The SCUF plant and the whey plant had, until 2009, been categorised as a single plant, so the plant team was familiar with both facilities, and did not see the process as unusual.

2.24 The new PD#2 sought, and the RA approved, rework of the WPC80 "*in a Fonterra plant (1239) where it will undergo filtration*". Only plant 1239 (and not plant 1282) was identified because the process would be concluded in plant 1239. And, in any event, plant 1282 had previously been part of plant 1239 (see above).

2.25 No guidance or approval was sought from the RA in relation to the rework plan (as was standard practice for Hautapu's quality team). The RA did not request specific details about the rework process from the Hautapu plant team. The Inquiry was advised that the RA rarely requested such details, although it would review them if Fonterra requested. In the Inquiry's view, it would have been prudent to have provided details about the rework process to the RA and to have sought approvals for that process from the RA. The Inquiry recognises that this failure was in part due to the absence of certain key quality and technical personnel at the time.

2.26 The Inquiry understands the circumstances that led to only the whey plant being identified in the new PD. Nevertheless, the failure to identify in PD#2 both plants and, in particular, the process that was to be employed to link them undermined the regulatory safeguard. It was also indicative of the Hautapu plant not sufficiently engaging with the novel nature of the process that was being proposed.

Decision Points 5 and 6

Omission of Change Control procedure for Hautapu reworking
Set up of reworking process with ad hoc pipeline arrangement

2.27 A diagram of the WPC80 rework process, prepared by Fonterra, appears in Appendix B, for convenience.

2.28 The majority of the rework process used fixed pipes that were used and cleaned on a daily basis as part of the hydrolysate and WPC production. However, the WPC80 rework process also involved use of:

- flexi-hoses (chosen from a set of available flexi-hoses hanging on the wall) to bypass equipment not required for the rework; and
- the "MF Line", a fixed pipe used rarely, in this case used to transfer the product from the SCUF plant to the whey plant for drying (not a step required in the more frequent rework of hydrolysate).

2.29 Plant processes are ordinarily governed by Hazard Analysis and Critical Control Points (*HACCP*) plans. Because of the novel nature of this process, no single HACCP plan existed for WPC80 rework across the SCUF plant and the whey plant (although each part of the processing stage was provided for in each of the HACCPs for plants 1239 and plant 1282). Thus, there was no one specific process that set out each of the particular steps required for this rework process, and in particular the risks that might arise out of using (a) the flexi-hoses to cut out certain processing steps, and (b) the rarely-used MF line to transfer the product between the two plants.

2.30 As part of Fonterra's Compliance System, a Change Control procedure must be followed whenever a change to any part of Fonterra's operations is being made. The formal Change Control process is triggered if the change could impact food safety.

2.31 A formal Change Request must be made specifying what is actually changing. Further, a risk assessment of the changes must be performed by the "Change Owner" (who made the Change Request) with the assistance of any appropriate subject matter experts (for example, the Quality Co-Ordinator, the Product Manager, the Regulatory Advisor). Risks must be identified and approval from relevant stakeholders must be obtained.

2.32 The Hautapu plant team did *not* raise a Change Request for the new plan to rework the WPC80, despite the fact that the proposed plan was novel and would use rarely-used pipes to transfer the product from the SCUF plant to the whey plant.

2.33 The extent of approval sought for the process was an email from the plant team to the quality team asking for confirmation that a proposed rework technical plan was acceptable. The quality team did not give such confirmation, instead only directing the plant team to ensure that the proposed plan complied with the "Rework controls" standards set out in the Fonterra Standards of Excellence.

2.34 The likelihood of a risk assessment effectively anticipating the SRC/pipes issue cannot be quantified. Nonetheless, this omission was an error of judgment.

Decision Point 7

Choice of pre-reworking cleaning processes (without acid wash)

2.35 The Hautapu plant team did undertake serious cleaning steps in relation to the use of the flexi-hoses and the MF line.

2.36 The cleaning processes before the rework consisted of:

- two caustic "clean-in-place" (*CIP*) washes five days before production; and
- two caustic washes one day before production.

2.37 The Hautapu plant team confirmed to the Inquiry that two caustic washes was a standard clean applied when pipes were being used which had been inactive for a period.

2.38 An acid wash was not applied. The plant undergoes an acid wash once a week. It is an automatic process. The Inquiry considers that best practice requires acid cleaning to be performed on any equipment unused for over 24 hours and that an acid wash should have been performed in this case prior to the reworking procedure. The advantage offered by the acid wash over a caustic wash is that it is capable of removing any accrued product collected within the pipes, and eliminating any microbiological issues being caused by that accrued product. (See further, Appendix E.)

Decision Points 8 and 9

Darnum preparations for financial claim on NZMP for Hautapu WPC80 batches' quality (excess SRC levels - without breach of specification).

Darnum request that FRDC investigate the Hautapu SRC beyond identification of origin.

2.39 Fonterra Darnum's initial response to discovery of high SRC levels in some of the nutritional base powders it made for a customer was to identify the origin of the high SRCs. The team at Darnum initially thought that the high SRC levels were caused by the raw milk collected around that period. But, on 3 April 2013, an investigation by Darnum (with the assistance of the FRDC) identified the source of the high SRC levels as being from the WPC80 product from Hautapu.

Having identified the source of the WPC80, Darnum's focus shifted to ensuring that the customer would accept, if not all, as much of the product made using affected WPC80 as had SRC levels above the customer specification. The customer's specification required that, if there were excessive SRC levels, the product needed to be checked to ensure that *C. perfringens* was not present.

2.40 Accordingly, on 9 April, and to help to convince the customer to accept the product notwithstanding the high SRC levels, Darnum requested that FRDC test the SRCs to ascertain the whether the organisms were *C. perfringens*, or another type of organism. It appears that no consideration was given at this time by Darnum or FRDC about what other organism could be part of the SRCs, and the potential consequences for Fonterra (although, later on 26 April, the customer's microbiologist explained to Darnum that one of the concerns of high SRC counts is the potential for a toxin to be present).

2.41 FRDC concluded (in a report sent to Darnum on 15 April 2013) that the samples were not *C. perfringens*, but that instead they were *C. sporogenes*. In light of the customer's specification, Darnum noted that such information would be "*valuable for discussions with our customer*".

2.42 It was at this point that Darnum began contemplating an internal financial claim against NZMP in the event that the customer did not accept some or all of the affected product. To that end, Darnum commissioned further testing by FRDC to confirm that the clusters of *C. sporogenes* found in the end product were consistent with the clusters of *C. sporogenes* found in the WPC80. In addition, and because Darnum had passed on to FRDC the comments made by the customer's microbiologist, FRDC began investigating testing methods for distinguishing between *C. sporogenes* and *C. botulinum*.

2.43 On 8 May 2013, FRDC confirmed to Darnum that the *C. sporogenes* identified in the final product had similar patterns to the *C. sporogenes* in the final product. The (very low) risk of the SRC actually being *C. botulinum* was also raised by FRDC, and it was suggested that further testing should be considered.

2.44 However, by this point (1 May 2013) the customer had declined to accept any of the product with SRC levels exceeding its specification. Accordingly, the team at Darnum turned its mind fully to making a financial claim against NZMP on the basis that the product was not fit for purpose. NZMP's response was that, despite the high SRC levels, the product was within specification (which did not contain an SRC test). The team at Darnum responded that the very high SRC counts pointed towards a significant deviation from hygiene or usual processes.

2.45 The financial claim was initially indicated as related to the (relatively low) purchase price. This low value did not trigger any immediate escalation to senior NZMP management. When the value of the claim was restated in terms of lost sales (some $1.1 million), NZMP senior managers became involved. The claim by Darnum was ultimately resolved by the NZMP Managing Director and APMEA Managing Director directly, on a pragmatic 50/50 split basis. The financial adjustment was immaterial to both the financial position of either

business unit and the remuneration incentives of any managers.

2.46 The Inquiry considers that testing beyond establishing the origin of the product should only have been made after consideration of:

- the state of the scientific literature on the credibility of the suggested risk;
- what the potential outcomes of the testing could be, and the consequences of such outcomes; and
- what measures might be required dependent on the outcome of any testing.

Decision Point 10

Non-escalation (in April/May) of suspicion re *C. sporogenes* (i.e. of low risk/high consequence *C. botulinum* discovery)

2.47 Despite the early May advice by FRDC that there was a (low) risk that warranted testing of *C. botulinum*, the issue was not escalated at that time or by the end of May. This appears to have been due to Darnum's advice to FRDC on 25 May that it had withdrawn all affected product from the infant food supply chain, and would not provide internal funding for further testing.

2.48 Nevertheless, the Darnum-related investigations had raised the topic of testing for *C. botulinum*. That topic should (and could) have been escalated by Darnum and/or by NZMP and/or by FRDC so that:

- the utility of *C. botulinum* testing could be assessed;
- any other potentially affected product could be identified and traced; and
- any appropriate measures could be taken.

2.49 The Inquiry considers that a combination of poor processes and errors of judgment meant that no one involved sufficiently escalated this topic to more senior levels in Fonterra to properly assess the utility and potential consequences of further testing.

Decision Point 11

Limited work on tracing Hautapu WPC80 batches in May/June/July (consequence of non-escalation).

2.50 Despite generating the question of whether the high SRC count in the Hautapu WPC80 batches involved *C. botulinum*, it appears that, until mid-June, no-one at Fonterra (either at plant level or in the FRDC) turned their mind to the correlation between the suggestions for further testing and identification and tracing of products affected by those batches of WPC80.

2.51 The first steps in any such tracing of the affected WPC80 in New Zealand took place on 14 June 2013, as part of the Nutritionals Technical team's SRC specification review (prompted by Darnum and the mis-match in specification between the ingredient production and end product). That review extended to identifying whether any product was made at Waitoa with the implicated WPC80.

2.52 Nutritionals Technical asked Hautapu staff to confirm the cyphers of affected WPC80 that may have been affected, which were confirmed on 18 June 2013 (JW17, JW18 and JW22). There appeared to be some appreciation of the need to identify the batches and to "*put a plan in place if they had been used*". Waitoa then confirmed that JW17 was used in production in January and March 2013 to make GUMP and FO product.

2.53 That prompted a decision to test the Waitoa product for SRC levels and *C. perfringens*, followed by toxin testing if the initial test results were

positive. No further mention appears to have been made of any tracing at that stage.

2.54 No further tracing took place until 19 July 2013, when the FRDC provided Nutritionals Technical with preliminary results indicating that the SRCs were more comparable with *C. botulinum* than with *C. sporogenes*.

2.55 The Inquiry considers that, had best practice been applied, the correlation between further testing and serious tracing work would have occurred much earlier, and no later than a decision to undertake further testing related to the suggested risk of *C. botulinum* in the Hautapu WPC80 product. Earlier work in this regard could well have led to a more orderly precautionary recall (if that became necessary).

Decision Points 12 and 13

Continued non-escalation based on assumption that there was a very low risk that AgResearch tests would indicate the presence of *C. botulinum*

Decision to add *C. botulinum* testing of Hautapu batches to (a) SRC spec setting process, and/or (b) tests for compliance with customer contract specifications

2.56 As noted earlier, toxin testing was originally suggested by the FRDC to Darnum in May 2013 because of FRDC's inability to definitively distinguish between *C. sporogenes* and *C. botulinum*. But Darnum advised that it had elected not to pursue the toxin testing because any out-of-specification end product had already been consigned to stock food.

2.57 It was Nutritionals Technical's subsequent June 2013 investigation into SRC specifications, and into the use of the contaminated WPC80 at Waitoa, that triggered the decision to test the Waitoa product made with the affected WPC80.

2.58 On 20 June, having established that affected cypher JW17 (of the Hautapu WPC80 produced in the May 2012 rework) was used in production of GUMP and FO, Nutritionals Technical confirmed by email to FRDC its decision to test the affected Waitoa product for SRCs and for *C. perfringens*. Those tests were consistent with the tests previously commissioned by Darnum, which were based on another customer's specification. Nutritionals Technical also advised that, if the SRC results were high, then it would need to decide whether to proceed with toxin testing.

2.59 In response to that email, FRDC shared with Nutritionals Technical its observations from the earlier Darnum experience, including that:

> *"Although the risk appears to be low, the Food Assurance team* [within FRDC] *does not have the expertise to make a call on the likelihood that the C. sporogenes strains in the nutritional powder blend will be toxigenic. Therefore, for this particular case (Darnum) we recommended that representative isolates of the C. sporogenes from the nutritional powder blend be screened for the ability to produce the C. botulinum toxin*".

2.60 In response, Nutritionals Technical suggested initiating toxin testing at the same time as SRC testing, so as to enable a "*very rapid and cautious approach*". This decision was confirmed to FRDC on 25 June 2013.

2.61 Limited escalation took place following the decision to initiate toxin testing. Nutritionals Technical explained the investigation into the WPC80 issue "*at a high level*" to its supervisor, the NZMP General Manager of Quality and Testing. However, the written communication from FRDC was not sent on to the NZMP General Manager of Quality and Testing, and nor does it appear that the discussion involved specifics of what was being tested and the nature of those tests.

2.62 No further escalation took place before 8 July 2013, when preliminary test results were returned by the FRDC. Those results did not confirm a positive toxin test, but were unable to rule out toxins without a mouse bioassay. Despite the uncertain test results, a 12 July update from Nutritionals Technical to the NZMP General Manager of Quality

and Testing stated that there was "*no risk here, purely precautionary*" in relation to toxin testing. The Inquiry considers that that advice did not address the point that, if testing was necessary, it involved the risk of the unexpected answer. A more detailed briefing to the NZMP General Manager of Quality and Testing may have triggered either review of the need for further testing or at least further escalation and steps to prepare for a recall of product, in the event that subsequent toxin tests came back positive.

2.63 It was on 22 July 2013, after confirmation from AgResearch that preliminary results indicated that the SRCs were more comparable with *C. botulinum* than with *C. sporogenes*, that a detailed escalation of the issue to the NZMP General Manager of Quality and Testing took place. This triggered the creation of the Critical Event Team and the start of further tracing work of all product that had used the implicated WPC80.

2.64 On 23 July 2013, Nutritionals Technical asked Fonterra reporting analysts to begin a wider tracing analysis of where the cyphers of affected WPC80 went. Nutritionals Technical also said that "*ideally if we can trace all of the product even if it went overseas that would be most ideal*". No explicit demand for a full trace back was made at this time. By 24 July 2013, initial results on a pallet-to-pallet basis were provided.

2.65 Also on 24 July 2013, the Critical Event Team formed by the NZMP Managing Director agreed to start a further trace back process for potentially affected product manufactured at Hautapu and at Waitoa. No mention was made of tracing for product manufactured at Darnum at this stage. The decision to advise Darnum of the need to conduct a trace back was not made until 5.15pm on 31 July 2013, when the Crisis Management Team (which had been established in place of the Critical Event Team following the preliminary positive toxin results from AgResearch) concluded that the NZMP Managing Director should contact the APMEA Managing Director about the issue.

2.66 A detailed analysis of Fonterra's tracing work appears at Appendix D.

2.67 The Inquiry is satisfied that the delays in escalation to senior managers were the result of a working assumption amongst those initially involved that the risk of a positive toxin test was extremely low. However, no one involved "joined the dots" to consider what might happen, and what might then be required, if the very unlikely outcome of testing did in fact eventuate. Had this been considered earlier, then Fonterra would at least have been better prepared to manage the subsequent precautionary recall.

Decision Point 14

Non-involvement of (a) Director of Research, Science, Technology and Development, and/or (b) international expert, and/or (informally) MPI,
at any time prior to AgResearch test results being received

2.68 Consistent with the decision not to escalate the issue further (see discussion above under decision points 12 and 13), the Fonterra personnel involved in making the decision to commence toxin testing do not appear to have considered:

- seeking the advice of the Chief Technical Officer; or
- obtaining expert assistance on *C. botulinum* (including by engaging an international expert on the subject, as Fonterra did after 2 August 2013, or by conducting further research into the risks of *C. botulinum* in infant formula or dairy products generally); or
- informally contacting MPI at the point at which the decision to conduct further testing at least (for *C. perfringens*) was made in mid June 2013. (But see the discussion of decision point 16, below.)

2.69 In the Inquiry's view, it is a key feature of the chain of causation of the precautionary recall that there was no one involved who asked the pertinent questions – Why are we doing this? What might we expect to find? Who else should be aware of

the proposal? In the absence of those questions, no one was able to "join the dots" and reshape the subsequent parts of the narrative.

Decision Point 15

Selection of AgResearch (and no other testing agencies) to undertake tests for *C. botulinum*.

2.70 FRDC initially contacted AgResearch on 7 May 2013, to ask how to distinguish between *C. sporogenes* and *C. botulinum* and how much AgResearch would charge to do that test. The Team Leader at AgResearch was regarded by the FRDC team as a subject matter expert in *C. botulinum*. The FRDC team had previously worked with the same AgResearch team in analysing a potential low salt cheese for *C. botulinum*.

2.71 The decision to engage AgResearch to test for *C. botulinum* in relation to the Hautapu WPC80 batches was made quickly, evidently on the basis of its unrelated work on *C. botulinum*, despite the fact that:

- the AgResearch laboratory was not an accredited laboratory in terms of the regulatory framework;
- testing of this nature was not the core business of this particular AgResearch laboratory – there were other laboratories within New Zealand (for example, MPI's Animal Health Laboratory or AsureQuality's laboratory in Auckland) that are accredited for the testing methods that were required in this case, even though the test for *C. botulinum* itself is not one that *any* New Zealand laboratory is accredited for; and
- the stated aims of the test (being to determine definitively whether or not the samples were *C. sporogenes* or *C. botulinum*) were in fact not achievable because AgResearch did not have the necessary resources.

2.72 Nor does it appear that Fonterra turned its mind to engaging more than one laboratory to conduct the testing. This is in contrast with MPI's decision after the event to engage two separate experienced laboratories in the United States to conduct the toxin testing by way of a mouse bioassay, together with a third (New Zealand) laboratory to conduct the DNA typing. (The Inquiry has been advised that such multi-lab testing is best practice in this context.)

2.73 The Inquiry appreciates that there were limits to Fonterra's ability to engage international laboratories (who might have been accredited) to conduct the testing due to the bioterrorism risk constraints on sending samples of that nature overseas. However, there were other laboratories within New Zealand that may have been better placed to do this work, and if this decision point had been approached in conjunction with, say, an international expert on the subject, the potential risk of a "false alarm" might have been averted.

Decision Point 16

Non-communication with MPI re *C. botulinum* testing at any time before final AgResearch test results received.

2.74 The Inquiry team has considered whether or not Fonterra could or should have approached MPI on an informal and precautionary basis, and whether that might have avoided the intense, even frantic, activity which occurred after the final AgResearch test results (from the mouse bio assays) were received on 31 July 2013. In the end, the Inquiry is not satisfied that such a course was either feasible or appropriate.

2.75 In a sense, this question (and a number of others arising in the WPC80 narrative) involves the management of uncertainties. In the food safety context, as the "false alarm" conclusion demonstrates, there is not always certainty; and the ubiquity of micro-organisms in the

environment means that any "no risk" assertion may be problematic. But governments and regulators must err on the side of caution. Manufacturers of food products will also err on the side of caution, yet there may be different thresholds.

2.76 In broad terms, the Inquiry recommends a high level of collaboration and relationship investment between MPI and food products manufacturers, not least Fonterra. At any more detailed level, the issues become more complex, including around such matters as informal and/or confidential protocols. It would also require much greater knowledge of the views and capacities of relevant regulators and food industry players. That is beyond the scope of this Inquiry which must leave further exploration of this important topic to the current Ministerial Inquiry.

Decision Point 17

Lack of intensive tracing work across organisation immediately after initial advice from AgResearch that there were signs of inconsistency with *C. sporogenes* assumption

2.77 See discussion of decision points 12 and 13, above.

Decision Point 18

Decision by Communications Team to "track issue closely."
No decision taken to begin preparation for communications elements of potential product recall.

2.78 See discussion of decision point 21, below, including the reference to Appendix H.

Decision Point 19

Limited instructions/assistance re SAP to expedite tracing complexities associated with JD Edwards to SAP platform change during period of Darnum use of Hautapu WPC80 batches.

2.79 It was not until early on Sunday, 18 August 2013 that Fonterra had traced all affected product. There were significant variances in the volume of affected product over the initial period (1 August through 5 August), and other more minor discrepancies were identified over the course of the next fortnight. The most notable variance was the initial advice from Australia on 1 August that there was 229MT of affected product, as compared with the figure (provided on 5 August) which was 1,693.1MT of affected product.

2.80 The final volumes of affected product were 837.5MT (New Zealand product – finalised on 8 August) and 1,757.5MT (Darnum product – finalised on 18 August).

2.81 The main tracing difficulties were:

- tracing through to customer systems for ex-New Zealand product. There is no one integrated system through to the end retailer which enabled an easy trace back;
- the manual nature of the JDE Australian system that was in use at the time of receipt and manufacture for most of the WPC80 product. That manual system resulted in transcription errors;
- incorrect assumptions that were made during the trace back process as to the volume on pallets;
- the changeover in Australia on 1 April 2013 (part way through the manufacture process) from JDE to a new SAP system. That changeover led to difficulties in identifying pallets, and particularly pallets which had been divided for airfreight or shipping with the result that some pallets were assumed to be "dummy pallets" and so were not counted initially; and

- the lack of any trace back procedures or experience in trace back exercises.

2.82 The Inquiry considers that, given the crucial importance of urgent and complete tracing (at least from 31 July), these difficulties should have been identified earlier, and the effect of those difficulties would have been minimised had appropriate expert assistance been deployed at an earlier stage. The main difficulties were encountered with the Australian tracing work, where an external SAP expert had been engaged at the outset, but it is possible that that expert was not fully utilised. And further internal expert resource was not brought into the Australian trace back exercise until Tuesday, 6 August 2013.

2.83 Further detail on the trace back and Fonterra's technology platforms is set out in Appendix D.

Decision Point 20

Notification of MPI after AgResearch advice on mice testing

2.84 There was of course a fundamental change in the nature of the WPC80 crisis following the 28 August 2013 MPI advice of the results of further testing of the SRCs derived from the relevant Hautapu WPC80 batches. The Inquiry has heard occasional queries about whether Fonterra itself should have commissioned further tests before notifying MPI and prompting the precautionary recall. The short answer is that Fonterra had no ethical or commercial alternative. (The legal issues are not addressed in this report because of the currently on-going MPI investigation into whether or not Fonterra breached the regulatory framework.)

2.85 In other words, by 1 August 2013 Fonterra had received apparently credible and clear advice from a reputable diagnostic team that the SRCs in question were *C. botulinum* (based on the best regarded test process – the mouse bio-assays), and it had established that some of the implicated ingredient was in the retail market. In those circumstances the proper and responsible course was to proceed to advise MPI and to play a full and active part in the precautionary recall.

Decision Point 21

Underestimation of potential scale of reputational risk, and overseas regulatory/government responses, to *C. botulinum* publicity

2.86 Fonterra's actions and responses to the WPC80 crisis from a communications and reputation standpoint are set out in detail in the "Narrative and Decision Points" section of the Inquiry report. The Inquiry considers it clear that, as an organisation, Fonterra greatly underestimated the global media attention and reputational risk involved with the precautionary recall, not least the pervasive impact of social media (especially in China). That underestimation reflected a lack of crisis management readiness (see Appendices F and G).

2.87 The criteria against which Fonterra's crisis communications planning should be measured are collected and authoritatively discussed in some detail by Professor Hallman and his team (in Appendix H). These include sophisticated pre-crisis planning and organisation, with aligned institutional policies, the inclusion of stakeholders in the planning process and full appreciation of the need for clear, coherent and consistent messages for particular kinds of crises and particular markets.

APPENDIX A
REGULATORY FRAMEWORK

New Zealand food safety regulation is complex for dairy material and dairy product processed for domestic consumption and export. Under the Animal Products Act 1999 (*APA*), the dairy industry is subject to bespoke layers of detailed requirements for risk management planning, implementation and verification. The body of regulatory requirements and guidance is not easy to navigate. Perhaps unsurprisingly, Fonterra's food safety compliance documentation is equally elaborate.

The APA sets a benchmark of dairy standards (elaborated in regulations) which all dairy material and products intended for trade (including export), or processed for reward, must meet in order to be considered "fit for intended purpose".

As a dairy processor, and in order to meet these dairy standards, Fonterra must have a registered Risk Management Programme (*RMP*).

The RMP is the "umbrella document" for a multitude of processes and procedures which must comply with:

- all relevant regulations and specifications made by the Director-General of MPI (*RMP Specifications*); and
- the processes and procedures under the Animal Products (Dairy Processing Specifications) Notice 2011 (*Dairy Specifications*).

The RMP Specifications and the Dairy Specifications include a requirement that the RMP contain:

- a hazard prevention programme including Hazard Analysis and Critical Control Point (*HACCP*) plans that include within them actions to be taken if the HACCP established parameters are not achieved;
- HACCP plans for the processes covered by the RMP that comply with CODEX HACCP guidelines. For example, dairy processors must manage the risk of pathogen contamination in dairy material and dairy product by conducting HACCP assessments of the processes and the product.

In addition:

- MPI has issued "approved criteria" for dairy processing (referred to as DPC1 and DPC3) by which Fonterra as a dairy processor and RMP operator may be judged to comply (or not) with the Dairy Specifications
- there are specific dairy exporting regulatory requirements; and
- there is the Australia New Zealand Food Standards Code (*Food Code*) which includes (among other things) certain microbiological criteria for food products (including dairy products).

To comply with these regulatory requirements, Fonterra has a Global Quality System, underneath which sits several Registered RMPs (which cover all aspects of Fonterra's New Zealand-based business). Each RMP is governed by the overarching Fonterra New Zealand Product Safety RMP Manual (PSRMP Manual) along with a list of Fonterra NZMP RMP Procedures (RMP Procedures).

The "Interaction of Fonterra Quality Management System and NZ Dairy Processing and Food Safety Regulatory Regime" flowchart below seeks to encapsulate in diagrammatic form the intersections between relevant food safety regulation and Fonterra's Global Quality system.

Comparison with regimes overseas

The Inquiry has reviewed the food safety regulatory systems in Australia, the United States, the United Kingdom and the European Union, with a particular focus on regulation of dairy processing and the manufacture of dairy material and products (including infant formula). It has also looked at the model standards, codes of practice and other guidance relating to dairy processing and dairy food safety provided by the Codex Alimentarius Commission (and collectively referred to as the *Codex*).

The Inquiry considers that New Zealand's dairy processing and food safety regulation is broadly in line with the comparator overseas jurisdictions. This is the case particularly at the level of regulatory design (regulation of dairy processing is a subpart of a larger

food safety framework, and there is an emphasis on dual regulatory/industry responsibility for ensuring food safety is achieved), and in terms of the principles upon which the regimes are based (such as industry specific risk management and adherence to HACCP-based control of hazards). The differences between the New Zealand regime and the comparator jurisdictions tend to lie in the level of prescription for meeting different requirements rather than leaving the issue of "how" to achieve required outcomes to the individual industry members.

While there is always room for some debate and improvement, the Inquiry considers the New Zealand regime to be essentially sound and in line with international best practice as encapsulated by Codex. In particular, the current regulatory framework in New Zealand is consistent with an international trend away from prescription and towards outcomes based regulation of food safety generally. The Inquiry sees little utility (and significant downside) in adopting a more prescriptive approach in relation to dairy processing and safety of dairy materials and products. This would be against international trends and best practice, and ultimately inhibit if not remove the ability of industry to be flexible and responsive to change.

INTERACTION OF FONTERRA QUALITY MANAGEMENT SYSTEM AND NZ DAIRY PROCESSING AND FOOD SAFETY REGULATORY REGIMES

KEY

- Fonterra Quality Management System
- RMP document
- Overseas regulation
- RMP related document
- RMP Verification
- NZ regulatory requirement

Fonterra Global Quality Policy, Manual, and Standards

Fonterra global approach to quality – in place for approx. 6 months

Applicable in any regulatory regime worldwide – built up from NZ Standards

Fonterra Business Management System documents

Business Unit (eg. NZMP) Standards

e.g. NZMP approach to quality – implements global standards in context of country specific (NZ) regulatory regime

Site or team specific SOPs (how to operate each plant) that link into RMP eg. WPC Evaporator and Drier SOP Manual

NZMP specifications

NZMP Standard Operating procedures

NZMP RMP

Required by Part 2, s 17 Animal Products Act 1999

Elaborated in Animal Products (Risk Management Programme Specifications) Notice 2008

Food safety standards that the RMP is directed at meeting are set in the Animal Products (Dairy) Regulations 2005

Specifications for meeting the standards are in Animal Products (Dairy Processing Specifications) Notice 2011

Approved criteria for meeting the specifications are set in DPC1, DPC3

Fonterra Quality Guidance Documents

Part of RMP and referenced in RMP but separate documentation

Layers of regulatory and non-regulatory specifications

Requirements in Animal Products (Risk Management Programme Specifications) Notice 2008

Layers of RMP documentation in Fonterra

Food Act 1981; FSANZ Food Code

DPC1

Animal Products Act, Part 5; Animal Products (Export Requirements – Dairy Products) Notice 2005; Animal Products (Official Assurance Specifications – Dairy Products) Notice; Official Assurances Programme guidance

Overseas legislation

MPI regulated

- Food standards Code specifications - eg. composition of dry milk powders; infant formula; microbiological limits

MPI regulated

- DPC1 General Dairy Processing specifications including microbiological limits

MPI regulated

- Overseas Market Access Requirements (OMAR) - covering areas where NZ Govt has regulatory equivalence agreements in place with other Governments(do not cover all importing country requlatory requirements)

Overseas regulation

- Country specific import specifications not covered by any OMAR
- Fonterra Market Eligibility Information Centre collects this information for each market

Customer specific require-ments

- eg. Previously often ISO9000-based - Moving to FSCC22000. Need a QM System in place to qualify. Global customers want global standards
- eg. Danone SRC tesing specs

Fonterra NZ

- PSRMP Manual - General requirements and chapters on site-specific requirements
- Sits alongside RMP Management Procedure (eg. Fonterra RMP templates, process for RMP validation, and Change Control Procedure)

NZFSA Animal Products (Requirements for RMP Outlines) Notice 2008; Animal Products (Risk Management Programme Specifications) Notice 2008; Animal Products (Dairy) Regulations 2005

Site specific RMPs

- e.g. Hautapu site PSRMP [R007]
- Documents each plant within the site, by relevant manufacturing process

Animal Products (Dairy Processing Specifications) Notice 2011; DPC1, DPC3

Production Line specific HACCP

- e.g. Hautapu Cheese WPC and Colostrum HACCP

Animal Products (Dairy Processing Specifications) Notice 2011; DPC1, DPC3

Fonterra NZ prerequisite programmes

- Applicable in all NZMP sites and processes.
- e.g. Pathogen management plan
- e.g.Pest control plan
- e.g.Heat treatment plan
- e.g.ID and traceability - etc

Animal Products (Dairy Processing Specifications) Notice 2011; DPC1, DPC3

Pathogen Management Plan Guidance Material

Animal Products (Dairy Processing Specifications) Notice 2011

MPI Approved Test Methods for Dairy Products (updated as at Aug 2013)

Testing occurs throughout 5 levels of specifications to verify a product is meeting all applicable requirements. Follows Fonterra Product design template (including relevant testing). Test results (compared to spec) dictate whether product will be released. Testing is also performed for product-specific hygiene indicators (e.g. Coliforms, E. Coli).
Testing also occurs as a means of internal validation of compliance with RMP/HACCP

Animal Products (Dairy) Approved Criteria for Recognition of Agencies and Persons (2011)

e.g. Laboratory Accreditation to ISO17025

Animal Products (Risk Management Programme Specifications) Notice 2008

Animal Products (Recognised Agencies and Persons Specifications) Notice 2011 No. 2

Animal Products (Dairy) Approved Criteria for Recognition of Agencies and Persons (2011)

Animal Products (Export Verification Requirements) Notice 2011

Verification of Fonterra compliance with NZ regulatory arrangements – in particular, RMP components, OMARs, Food Code specs, DPC1 and DPC3 specs,

Carried out by MPI-approved Recognised Agencies (**RA**) (AsureQuality Ltd for Fonterra)

Performance–based tiered verification system

Includes independent sampling and testing

Fonterra verification based on meeting export standards (more onerous than domestic standards that are based solely off FSANZ Food Code)

Disclosure requirements built into RMP - triggered through internal Fonterra and BU escalation processes

Process for dealing with non-release product (e.g. that fails testing or plant checks) – Fonterra escalation and manufacturing downgrade

If a food safety issue: (Product Safety Event)

RA/MPI set disposition options eg. Heat treatment, sifting

Fonterra list of likely options for submitting to RA/MPI for approval

Retesting unlikely unless indication of likely lab error

Extra testing may occur to determine cut-offs between safe and unsafe product

If not a food safety issue (e.g. SRCs – usually associated with spoilage not food safety):

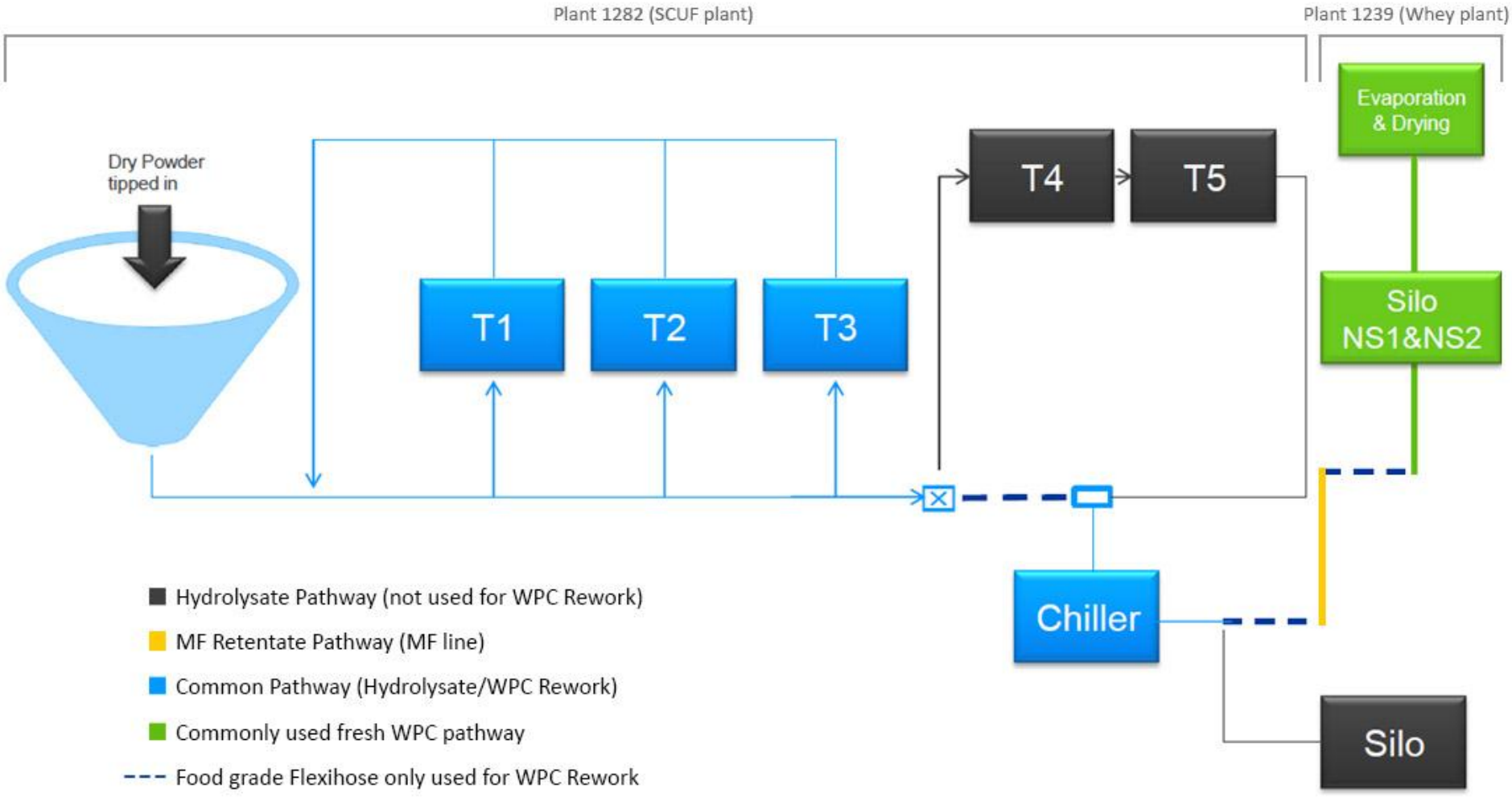
Business unit (eg. BU covering Darnum plant) makes decision on what to do with it – rework options developed by Product Solutions technicians.

BU decision-tree on options

May include retesting to clarify which options viable

Animal Products (Disposal of non-conforming Dairy Material or Dairy Product) Notice 2013

APPENDIX B – WPC80 REWORK PROCESS



APPENDIX C

BOTULISM / DECISION TO TEST / TEST RESULTS

What is Botulism?

1 Botulism[1] is a rare muscle-paralysing disease caused by a neurotoxin (*Botulism neurotoxin / BoNT*), which can be produced by bacterium called *Clostridium botulinum (C. botulinum)*. The disease is serious and is potentially fatal. *C. botulinum* is one species of sulphite-reducing clostridia (*SRCs*), which are anaerobic spore-forming bacteria that are widely present within the environment. Most SRCs are not toxic, but some are associated with food spoilage (e.g. *C. perfringens*).

2 *C. botulinum* produces rod-shaped spores that are heat-resistant and exist widely in the environment. *C. botulinum* is an anaerobic bacterium, meaning it can only grow in the absence of oxygen. In the absence of oxygen, *C. botulinum* spores can germinate, grow and then excrete toxins.

3 Botulism is rare despite the spores being widespread in the environment. We are more likely to be exposed to *C. botulinum* spores from the environment – for example, dust in the air – than we are from food. This is because foods are manufactured and handled in ways that prevent the growth of any *C. botulinum* that may be present at low levels in food, in order to prevent toxin being formed.

4 There are seven distinct forms of botulinum toxin, types A–G. Four of these (types A, B, E and rarely F) cause human botulism. These types are not commonly found in New Zealand. Types C, D and E cause illness in other mammals, birds and fish. These types are prevalent in New Zealand.

Types of botulism

5 There are three main forms of botulism:

Foodborne botulism

6 Foodborne botulism occurs when a person consumes food that contains the toxin.

7 Because *C. botulinum* is anaerobic, the bacteria can only grow in products with low oxygen content (and so those products might have micro-climates within them that are free of oxygen and enable the bacteria to grow and germinate). It also requires a low acidic environment (pH more than 4.6). Accordingly, the growth of the bacteria and the formation of toxin occur most often in lightly preserved foods and in inadequately processed, home-canned or home-bottled foods. The botulinum toxin has been found in a variety of foods, including low-acid preserved vegetables, such as green beans, spinach, mushrooms, and beets; fish, including canned tuna, fermented, salted and smoked fish; and meat products, such as ham and sausage.

8 Combinations of low storage temperature and salt contents and/or pH are also used to prevent the growth of the bacteria or the formation of the toxin.

Infant botulism

9 Infant Botulism occurs in susceptible infants (being, generally, infants less than six months old) who ingest *C. botulinum* spores (rather than the toxin) that then germinate into bacteria that then produce toxins and release the toxin in to the infant's gut. In most adults and children older than about six months, this would not happen because conditions in the body that develop over time prevent germination and growth of the bacterium.

Wound botulism

10 Wound Botulism is rare and occurs when spores get into an open wound and are then able to reproduce in an anaerobic environment and secrete toxin.

11 The disease has been associated with substance abuse, particularly when injecting black tar heroin.

Links with dairy

12 *C. botulinum* spores are present in raw milk. However, incidents of botulism from dairy products are extremely low, and are associated with cheese or yoghurt products that have not been or handled with proper sanitary practices (usually as a result of cottage industry or home manufacture). There is no conclusive link between *C. botulinum* with infant formula in the medical literature.

[1] Information summarised from World Health Organisation Fact sheet N270: Botulism.

13 Lindström et al[2] explain that milk and most milk products have a high water activity and are rich in protein, carbon, and minerals which provide an excellent growth medium for bacteria. Furthermore, the range of different processes involved in the various different dairy products also provides a range of environments in which bacteria can multiply.

14 The Lindström et al[3] paper states that there have been at least 20 human outbreaks of botulism that have been linked to dairy products. They include:

14.1 contamination of commercial brie cheese in France and Switzerland in 1973 and in 1979 during ripening at room temperature. The contamination was likely caused by straw contaminated with animal waste that was used as the bedding to ripen the cheese – approximately 100 cases reported altogether;

14.2 contamination of hazelnut yoghurt in the UK in 1989 – caused by the addition of an ingredient (hazelnut conserve) after the heat treatment process and where that ingredient contained a preformed neurotoxin – 27 cases reported and one death;

14.3 Italian mascarpone outbreak in 1996 – caused by a failure in heat process, eight cases reported and one death; and

14.4 home prepared yoghurt in Turkey in 2005 that was buried in soil but not sealed properly, thereby allowing the yoghurt to come into contact with the soil which caused contamination to the end product – 10 reported cases and one death.

15 Given the amount and widespread consumption of dairy products, there have been very few reported outbreaks of botulism, and thus the probability of developing botulism as a result of consuming dairy products is thus extremely low.

16 There is one study (Brett et al (2005))[4] which links infant formula milk powder with infant botulism. That paper considered a case of infant botulism in a five month baby in the UK in 2001. Brett's analysis concluded that the source of the contamination was from infant formula powder, on the basis that the *C. botulinum* identified from the child's faeces was identical to that present in both opened and unopened infant formula at the child's home.

17 However, a different study concluded that there was no proven link in that case (Johnson et al (2005))[5]. The tests conducted by Johnson et al concluded that the organism identified from the unopened can of infant formula was different from the organism in the opened can of formula and from *C. botulinum* in the child's faeces. Johnson et al considered that an alternative environmental source was more likely and also commented that one would have expected to have seen a wider outbreak if the infant formula had been contaminated (the formula in issue had been manufactured in 1998 and so had been available in the market for some time before the 2001 incident).

18 The Brett and Johnson studies were conducted contemporaneously and published at about the same time.

19 The International Commission on Microbiological Specifications for Foods[6] update on *C. botulinum* and infant formula products refers to both the Brett and Johnson

[2] Lindström, M., Myllykoski, J., Sivelä, S., and Karokeala, H. (2010) "Clostridium botulinum in Cattle and Dairy Products", *Critical Reviews in Food Science and Nutrition*, 50: 281 – 304.

[3] Lindström, M., Myllykoski, J., Sivelä, S., and Karokeala, H. (2010) "Clostridium botulinum in Cattle and Dairy Products", *Critical Reviews in Food Science and Nutrition*, 50: 281 – 304.

[4] Brett, M. M., McLauchlin, J., Harris, A., O'Brien, S., Black, N., Forsyth, R. J., Roderts, D., and Bolton, F. J. (2005). "A case of infant botulism with a possible link to infant formula milk powder: evidence for the presence of more than one strain of *Clostridium botulinum* in clinical specimens and food" *Journal. Med. Microbiol.* 54:769–776.

[5] Johnson, E.A., Tepp, W.H., Bradshaw, M., Gilbert, R.J., Cook, P.E. and McIntosh, D.G. (2005) "Characterisation of Clostridium botulinum strains associated with an infant botulism case in the United Kingdom" *Journal. Clin. Microbiol.* 43 (6): 2602-2607.

[6] The International Commission on Microbiological Specifications for Foods: "Usefulness of testing for *Clostridium botulinum* in powdered infant *formula and* dairy-based ingredients for infant formula" (27 August 2013).

studies. The ICMSF concludes that *C. botulinum* is not considered a hazard in infant formula products and so the ICMSF does not recommend routine testing for the pathogen.

20 The Food and Agriculture Organisation (*FAO*) and World Health Organisation (*WHO*) categorises *C. botulinum* as "causality less plausible or not yet demonstrated" in infant formula products.[7] In reliance on the FAO/WHO classifications, the Codex "Code of hygiene practice for powdered infant formulae for infants and young children"[8] focuses on known risks in infant formula products, including *Salmonella enterica* and *Enterobacter sakazakii*, and the usefulness of tracking levels of Enterobacteriaceae in the manufacturing process as a general indicator of hygiene.

Testing for C. botulinum

21 There is no available "routine" test to identify *C. botulinum* in dairy processing. There can be (and is already) expanded routine testing for SRC levels, but identifying *C. botulinum* is very difficult – and although there are a number of different screening/sequencing methods, there is only one definitive test, namely a mouse bioassay. Such testing involves subjecting specially bred mice to experimentation and the possibility of death, and is only undertaken in some countries. This methodology is acknowledged as having a high ethical cost and thus should only be used when absolutely necessary.

22 The International Union of Microbiological Societies' 27 August 2013 report explains that detection of *C. botulinum* is difficult, partly because of its numerous different strains, which requires multiple different methods to detect relevant strains. Furthermore, confirmation of toxin production requires a mouse bioassay which was not designed as a screening tool for the quality control or assessment of foods, and is not suited to routine food microbiology laboratories because special security and biosecurity precautions are required. There are only a limited number of specialised laboratories in the world that are able to do this work.

23 Among other drawbacks, mouse bioassays are time consuming and require a significant number of laboratory animals in order to properly confirm or otherwise the presence of *C. botulinum*. It requires isolation of the toxin with antibodies to discount the possibility that the mouse has died from unrelated sources or a different toxigenic source. The Bacteriological Analytical Manual (*BAM*)[9] states that "*Death of mice without clinical symptoms of botulism is not sufficient evidence that injected material contained botulinal toxin. On occasion, death occurs from other chemical present in injected fluid, or from trauma.*"

24 Typical clinical systems in mice usually occur in the first 24 hours with ruffling of fur, followed in sequence by laboured breathing, weakness of limbs, and finally total paralysis with gasping for breath, followed by death due to respiratory failure.[10] Other advice provided by BAM is that:

24.1 the first 24 hours are the most important time regarding symptoms and death of mice: 98-99% of animals die within 24 hours;

24.2 typical symptoms of botulism and death may occur within 4 to 6 hours;

24.3 if deaths occur after 24 hours, BAM recommends that the laboratory should be very suspicious, unless typical botulism symptoms are clearly evident; and

24.4 if deaths occur in mice injected with the 1:2 or 1:5 dilution but not with any higher dilution, BAM again advises the laboratory to be very suspicious and states that the deaths may have been from nonspecific causes.

25 Other recognised (but non-definitive) testing methods include:

[7] FAO/WHO (Food and Agriculture Organization / World Health Organisation) (2004) Enterobacter sakazakii and other microorganisms in powdered infant formula meeting report. Microbiological Risk Assessment Series 6. FAO/WHO.

[8] CAC (Codex Alimentarius Commission) (2008) Code of hygiene practice for powdered infant formulae for infants and young children. CAC/RCP 66-2008.

[9] Bacteriological Analytical Manual, Chapter 17 *Clostridium botulinum* (January 2001).

[10] Bacteriological Analytical Manual, Chapter 17 *Clostridium botulinum* (January 2001).

25.1 analysis of the sample's phenotypic properties – i.e. was the appearance of the sample consistent with that of *C. botulinum*;

25.2 enrichment of the sample through the use of a culture, then followed by polymerase chain reaction (*PCR*) - which is a technology used to amplify a single or a few copies of a piece of DNA to assist with DNA sequencing (the results are then compared with known DNA sequences for *C. botulinum* strains);

25.3 enzyme-linked immunosorbent assay (*ELISA*), which is a test that uses antibodies and colour changes to identify a particular substance. BAM suggests two different types of ELISA method, one being an amplified ELISA procedure (which provides increased sensitivity in results) and the second using Digoxigenin-labeled immunoglobulins (*IgGs*) and the ELISA (*Dig-ELISA*). Digoxigenin is a particular antibody that aids in immuno-assays such as ELISA;

25.4 random amplified polymorphic DNA analysis (*RAPD*) – a method which amplifies segments of DNA at random which allows for genotyping / genetic fingerprinting, including by PCR;

25.5 pulsed-field gel electrophoresis (*PFGE)* branding patterns – a technique which separates DNA molecules and allows for genotyping / genetic fingerprinting.

26 These other immunological methods are not as sensitive as the mouse bioassay and they also detect biologically inactive toxin genes.

27 The International Union of Microbiological Societies does not recommend routine testing for the pathogen (except for end product testing in the event of an outbreak in order to determine source). The Society does recommend testing for SRCs as an indicator of process hygiene. In the Society's view, SRC results of above 100 colony forming units per gram (cfu/g) would point to conditions that are generally conducive to the presence of anaerobic clostridia or some other contamination.

Initial testing by Fonterra

Identification of high SRC counts at Darnum

28 On 18 March 2013, tests carried out as part of the manufacturing of nutritional powders for Customer A at Darnum showed elevated SRC levels for some of the final product. Some, but not all, of the product was outside Customer A's specification. An investigation by the team at Darnum identified the source of the high SRC levels as the WPC80 product from Hautapu.

29 At Darnum's request, the Fonterra Research & Development Centre (*FRDC*) *at* Palmerston North tested the SRCs to ascertain whether the organisms were *C. perfringens* (a known issue for food spoilage).

30 FRDC used:

30.1 tests specified in NZTM2: New Zealand Dairy Industry Microbiological Methods Manual for the detection of SRCs; and

30.2 a mass spectrometer with a matrix-assisted laser desorption/ionization time of flight (*MALDI-TOF*) to analyse the protein profiles of the samples.

31 From that analysis, FRDC concluded that the samples were not *C. perfringens*, but that instead they were *C. sporogenes*. FRDC sent its full report to Fonterra Darnum on 11 April 2013.

32 Customer A was advised of the issue and sought the advice of its expert microbiologist. On 25 April 2013, Customer A sent an email to say that its expert microbiologist had explained that the main concern behind Customer A's SRC specification was of the risk of infant botulism caused by *C. botulinum*.

33 FRDC made enquiries of AgResearch to ask how Fonterra could differentiate between

C. sporogenes and *C. botulinum* given their genetic similarities. AgResearch suggested PCR tests and a mouse bioassay. On 7 May 2013, FRDC emailed Fonterra Darnum stating that:

> *"Unfortunately, nothing in microbiology is simple. So, you should also know that a C. botulinum is simply a C. sporogenes without* [sic "with"] *the toxin gene. This being the case we are checking out whether AgResearch (at Massey University) can assay for the presence of the toxin gene. It is EXTREMELY UNLIKELY that these organisms, which Maldi identifies as C. sporogenes, are carriers of the toxin gene. We certainly don't want to be alarmist. However, we would be derelict in our duty if we did not consider the possibility."*

34 On 20 May 2013, FRDC released its WPC80 SRC investigation and testing report. The key findings were that:

34.1 the dominant clostridium species isolated from the Darnum nutritional powder blend and the Hautapu WPC80 was *C. sporogenes*;

34.2 the presence of large numbers of *C. sporogenes* prompted a question as to whether they might pose a health risk to infant consumers. The paper recorded that clostridium experts have stated that strains of the pathogen *C. botulinum* Group 1, which are unable to produce toxin, are referred to as *C. sporogenes*; and

34.3 although FRDC concluded that the risk was low, FRDC recommended that representative isolates of the *C. sporogenes* from the nutritional powder blend should be screened for the ability to produce the *C. botulinum* toxin at AgResearch in Palmerston North (~$2000/sample). The stated alternative was to withdraw the product in question from the infant food chain.

35 On 25 May, Fonterra Darnum advised FRDC that it did not want to proceed with toxin testing because all affected product had been rejected by Customer A and had been withdrawn from the infant food chain.

Identification of further batches of affected product at Waitoa

36 In mid-June, the operational team at Hautapu and Waitoa were asked by the Nutritionals Technical team to identify whether any of the three affected batches of WPC80 product (from batches JW17, JW18 and JW22) had been used in production. On 19 June, Waitoa staff confirmed that WPC80 from JW17 had been used in production in January and March 2013.

37 On 20 June, Nutritionals Technical confirmed by email to FRDC its decision to test the affected Waitoa product for SRCs and *C. perfringens*, and that if the SRC results were high then it would need to decide whether to proceed with toxin testing.

38 In response to that email, FRDC shared with Nutritionals Technical its observations from the earlier Darnum experience, including that:

> *"Although the risk appears to be low, the Food Assurance team* [FRDC] *does not have the expertise to make a call on the likelihood that the C. sporogenes strains in the nutritional powder blend will be toxigenic. Therefore, for this particular case (Darnum) we recommended that representative isolates of the C. sporogenes from the nutritional powder blend be screened for the ability to produce the C. botulinum toxin*".

39 The Head of Nutritionals Technical then suggested initiating toxin testing at the same time as SRC testing, so as to enable a "*very rapid and cautious approach*". The decision by the Nutritionals Technical team to initiate toxin testing in parallel was confirmed to FRDC on 25 June 2013.

AgResearch

Engagement of AgResearch

40 FRDC initially contacted AgResearch on 7 May 2013, to ask how to distinguish between *C. sporogenes* and *C. botulinum* and how much AgResearch would charge to do that test. The Team Leader (for Food Assurance and Meat Quality) at AgResearch replied on 8 May that a PCR analysis is between $500 and $1,500 per assay, and a mouse bioassay would be $2,000 per sample.

41 FRDC explained to the Inquiry that the Team Leader was regarded by the FRDC team as a subject matter expert in *C. botulinum* and that she has a PhD in *C. botulinum*. The FRDC team had previously worked with the Team Leader's AgResearch team in analysing low salt cheese for *C. botulinum*.

42 On 26 June, FRDC contacted the Team Leader to advise that Fonterra wished to engage AgResearch to conduct the toxin testing. There then followed some negotiation on the terms of the contract for the testing, and the contract obtained final sign-off from Fonterra's legal team and FRDC on 18 July 2013. The total contract price was $7,500 plus GST. The services to be provided were DNA fingerprinting and mouse bioassay to determine the relatedness of bacterial isolates to *C. sporogenes*. The mouse bioassay was to provide confirmation of the toxigenic status in the mice.

Accreditation

43 Laboratories in New Zealand can be accredited by International Accreditation New Zealand (*IANZ*) to International Organisation for Standardisation (*ISO*) standards. Certificates of accreditation specify what the scope of accreditation for the particular laboratory is, and compliance with accreditation criteria is confirmed by IANZ through regular assessments.

44 AgResearch's laboratory at Ruakura, Hamilton is not an accredited laboratory. The AgResearch laboratory at Palmerston North is accredited for tests of foods, agricultural products, agricultural materials and other specified organic materials. The only AgResearch facility accredited for DNA/molecular biology testing is its GenomNZ laboratory in Dunedin. That accreditation extends to PCR and MALDI-TOF techniques, but a mouse bioassay is not listed as an accredited test. There is no laboratory in New Zealand that is accredited for the BAM method test for *C. botulinum*.

45 The Inquiry notes that:

45.1 FRDC is accredited as a biological testing laboratory for the detection of SRCs and other industrial cultures in accordance with the NZTM2: New Zealand Dairy Industry Microbiological Methods Manual; and

45.2 AsureQuality's laboratory in Auckland is accredited as a biological testing laboratory, including for the BAM method of testing for *C. perfringens*.

AgResearch Preliminary Report

46 AgResearch kept Fonterra informed of the progress of its test results:

46.1 on 17 July 2013, AgResearch informed FRDC that the samples did not look like, and were not behaving as AgResearch would expect if they were, *C. sporogenes*;

46.2 on 22 July 2013, AgResearch informed FRDC of the preliminary typing results;

46.3 on 30 July 2013, AgResearch advised FRDC that one isolate had some toxic effect but that the researchers needed to do further testing, including with heat activated samples; and

46.4 at 12.07pm on 31 July 2013, AgResearch emailed FRDC to advise that the isolates results were strongly positive.

47 AgResearch's Preliminary Report was received at 11.30am, Friday 2 August 2013.

48 AgResearch employed a variety of typing methods as well as conducting the mouse bioassay, the preliminary results of which were:

48.1 PCR – negative for *C. botulinum* type A. Other results equivocal due to lack of suitable control samples;

48.2 amplified ribosomal DNA restriction analysis (ARDRA)-PCR genetic fingerprinting – the samples were in one of two groups, being either Group 1 (*C. botulinum* types A, B or F) or Group 2 (*C. botulinum* types C and D) but the test results could not distinguish between *C. sporogenes* and *C. botulinum*;

48.3 enterobacterial repetitive intergenic consensus (ERIC)-PCR genotypic fingerprinting – this analysis was able to distinguish between *C. sporogenes* and *C. botulinum*, and all samples shared bands with *C. botulinum* types A and D;

48.4 amplified fragment length polymorphism (AFLP)-PCR genotypic fingerprinting – still waiting for results at the time of the Preliminary Report;

48.5 MBA – all samples showed toxigenic effect at 1ml dosing with heat treatment inactivating the toxigenic effect. The symptoms observed were as expected for the *C. botulinum* toxin.

49 The Preliminary Report's key conclusions were:

1. *"All Fonterra samples were shown to be toxigenic in the MBA and dosed mice exhibited classic symptoms to botulinum toxin.*
2. *Fonterra isolates are likely to be* C. botulinum *as shown by the level of similarity seen in the DNA fingerprinting analysis. Although we cannot rule out other close relatives such as* Clostridium novyi *and* Clostridium haemolyticum *as 16S rDNA sequences of* C. haemolyticum *cluster with* C. botulinum *types C and D, and* C. novyi *strains group with* C. sporogenes*.*
3. *At this stage we are unable to type the toxin type – need to develop either PCR or ELISA capability."*

50 The mouse bioassay observations recorded in this Preliminary Report as being "characteristics" signs of *C. botulinum* included:

50.1 the mice being cyanotic after dosing and showing little response to stimulation;

50.2 rapid respiration rates; and

50.3 the mice becoming immobile with rapid abdominal breathing.

51 This Preliminary Report did not include any detail on methods, including methods of obtaining the samples, the culture of those samples and the procedure followed during the mouse bioassay.

AgResearch Final Report

52 The AgResearch Final Report was issued on 30 August 2013, one day after the release of MPI's report (see below).

53 The Final Report is 32 pages (as compared with the 4 page Preliminary Report). It includes detailed descriptions of the methodology used, including the particular typing methods, the isolates, enrichment and extraction methods, cross contamination controls and the procedure used for the mouse bioassay.

54 The key conclusions section was updated to read:

> *"The genetic analysis indicated a clonal relationship between the three Fonterra isolates (1a6, 2a9 and 3a1), and a broader similarity to C. botulinum references strains types A and D, when compared to C. sporogenes.*
>
> *These data suggest that the Fonterra isolates are likely to be C. botulinum, as shown by the level of similarity with C. botulinum type A seen in the DNA fingerprinting analysis. However, without further analysis other closely related bacterial species such as C. novyi and C. haemolyticum cannot be eliminated, as 16S rDNA sequences of C. haemolyticum cluster with C. botulinum types C and D, and C. novyi strains group with C. sporogenes.*
>
> *The MBA results were consistent with the presence of botulinus toxin in the*

undiluted supernatants produced from the three Fonterra isolates (1a6, 2a9 and 3a1).

Although not conclusive of C. botulinum, in totality the toxicology and genetic fingerprinting analysis of the Fonterra samples (1a6, 2a9 and 3a1) were of sufficient concern that we chose to inform Fonterra and recommend that further characterisation of the isolates be carried out."

55 The Final Report also included results that had not been available at the time of the Preliminary Report being:

55.1 the results from the (AFLP)-PCR genotypic fingerprinting, which showed that the three isolates were related to each other, and that they were more closely related to *C. botulinum* type A rather than *C. sporogenes*; and

55.2 the post-mortem examinations that were carried out on all 14 mice, which did not detect any abnormalities.

MPI report

56 The MPI released its report on the Laboratory identification of the Fonterra bacterial isolates on 29 August 2013. MPI commissioned tests from:

56.1 MPI's Animal Health Laboratory (*AHL*) – which identified the bacterial strain, conducted biochemical and phenotypic testing, and performed PCR, ELISA and next generation sequencing tests. AHL is an accredited laboratory for both PCR and ELISA testing, but not in relation to *clostridium*;

56.2 the Centres for Disease Control and Prevention (*CDC*) at Atlanta, Georgia, USA – which conducted a mouse bioassay; and

56.3 the National Veterinary Services Laboratories (*NVSL*), United States Department of Agriculture, Ames, Iowa, USA – which conducted a mouse bioassay.

57 The conclusions were that:

57.1 the isolates were identified as belonging to either *C. sporogenes* or *C. botulinum* Group I (toxin types A, B and F) using sequencing and phylogenetic analysis by AHL;

57.2 AHL's PCR tests were negative for *C. botulinum*;

57.3 AHL's next generation sequencing analysis showed the samples had the closest relationship to *C. sporogenes*;

57.4 NVSL's mouse bioassay results were negative for *C. botulinum*;

57.5 CDC's mouse bioassay results were negative for *C. botulinum*; and

57.6 all three samples were not toxigenic and were identified as *C. sporogenes*.

58 The report is detailed (42 pages including appendices) and sets out the methodology used (including the samples obtained, the culture and enrichment process, transportation to the USA, and the particular test methodologies by AHL). The report did not, however, include the methodology or observations from either mouse bioassays performed by either NVSL or CDC. So it is not possible, from this report, to compare the behaviour of the mice with the observations made by AgResearch during its mouse bioassay.

Observations

Non appreciation of the risk involved

59 The decision to test was made without any of the personnel involved "joining the dots" and thinking about what might be necessary (or what the steps might be needed) if the test results came back as positive for *C. botulinum*.

60 The consequences of the failure to engage with the risk of a positive result appears to be one of the reasons for non-escalation of the testing/issue and the failure to start a comprehensive product trace back prior to notification of the preliminary test results at the end of July 2013.

Decision to engage AgResearch (and acceptance of task by AgResearch)

61 The Inquiry's view is that the AgResearch test was not capable of achieving the outcome that Fonterra wanted.

62 First, AgResearch was not an accredited laboratory, and so there would always have been a question over the test results (irrespective of the outcome of the testing). Indeed, the Inquiry understands that there is *no* laboratory in New Zealand that is accredited for testing for *C. botulinum*, and that the only laboratories with recognised experience are based overseas. The Inquiry recognises that Fonterra is restricted in its ability to send samples of this nature overseas due to international bioterrorism controls, and so absent government assistance, it was not a practical reality to send this task to an accredited laboratory.

63 However, testing of this nature was not the core business of this particular AgResearch laboratory – there were other laboratories within New Zealand (for example, MPI's Animal Health Laboratory or AsureQuality's laboratory in Auckland) that are accredited for the testing methods that were required here, even if the test for *C. botulinum* itself is not one that any New Zealand laboratory is accredited for.

64 Second, the stated aims of the testing were not achievable. The contract stated that the services to be provided were DNA fingerprinting and mouse bioassay to determine the relatedness of bacterial isolates to *C. sporogenes*. The mouse bioassay was to provide confirmation of the toxigenic status in the mice. The email exchanges between FRDC and AgResearch in advance of the contract state that:

> "The outcome required – a letter stating that these organisms are either *C. sporogenes* or *C. botulinum* and does/not have the ability to produce BoNT."

65 AgResearch did not have the typing methods recommended by BAM (such as ELISA), and it did not have the all the resources necessary for the mouse bioassay (such as antidotes for the various strains of BoNT). Accordingly, AgResearch was never going to be in a position where it was able to definitively produce that stated "outcome required".

Action taken by Fonterra

66 In the Inquiry's view, the conclusions in the Preliminary Report left Fonterra with no alternative but to conclude that there was a serious risk of *C. botulinum* in the affected product.

67 Furthermore, and contrary to the assertion made in the Final Report, the Preliminary Report does not recommend further testing, and FRDC has told the Inquiry that no one recalls any such statement being made by AgResearch at the time of the Preliminary Report.

68 In any event, the Final Report is, in a sense, irrelevant because Fonterra had (quite properly) made its decisions on the basis of the Preliminary Report and the email updates that it had received leading up to that Preliminary Report. The Final Report contains the same key conclusions to the extent that the isolates were "likely to be *C. botulinum*" and that the mouse bioassay results were "*consistent with the presence of botulinus toxins*".

69 The reality was that anything less than a statement that "*there is no sign of botulinus in these samples (within the limits of assay accuracy)*" would have been problematic and would have left Fonterra with limited room to move. And it would appear that no laboratory in New Zealand was sufficiently qualified to

perform the analysis that would have been required to provide such a conclusion.

Criticisms of the AgResearch reports

70 For completeness, the Inquiry noted that, following the release of the MPI report on 29 August 2013, there was some public discussion of the evident discrepancy between the results of the MPI commissioned tests, and those undertaken by AgResearch. While the Inquiry is aware of criticisms of the AgResearch work, it does not need to form any concluded view on them, and has not sought AgResearch's responses.

APPENDIX D
FONTERRA'S TRACE BACK & IT SYSTEMS

Fonterra's IT landscape

Fonterra's current IT environment has been fragmented, with multiple different systems in use as well as incompatible versions of the same systems. Since 2010, Fonterra has been working towards a long term goal of one global SAP system. SAP is a German manufactured enterprise resource planning (*ERP*) application system. A paper presented to Fonterra's board in January 2010 recommended a staged process whereby each region was moved to one SAP platform.

One of the primary motivations for the change was to move from old systems that were identified as a being high risk. The secondary motivation (and long term aim) was to build a foundation that would enable one global SAP system to be introduced in 10 years' time.

The Board approved that recommendation and since that time, Fonterra (global) has moved from 27 different ERP systems to 5 ERP systems.

Fonterra Australia

Until April 2013, Fonterra Australia was predominantly using a JD Edwards (*JDE*) ERP platform (JDE is company that originated in Colorado and which has since been acquired by Oracle). Fonterra Australia's JDE system used a mixture of manual and electronic processes. It was identified as being a risk to Fonterra's business.

Project Catalyst was tasked with leading the changeover from JDE to SAP in Australia. The project team included personnel from SAP, Fonterra and other independent consultants. The aim was to introduce one SAP system into the Australian business (both ingredients and brands) with as few changes to the core SAP model as possible. The team achieved its aim, with the core SAP model making up 80% of the Australian SAP system.

Project Catalyst began with training within the Australian ingredients business between January and March 2013. The switchover to SAP occurred over Easter weekend, with the go live date as 1 April 2013. On the IT front alone, the changeover was smooth and went without any major glitches. It did however occur over the period that Fonterra Darnum made products using the contaminated WPC80 from Hautapu.

Fonterra New Zealand

Fonterra's New Zealand Milk Products business unit (*NZMP*) has used an SAP system since 2004. This system is now relatively out of date and requires significantly more processes than the more modern SAP system that has been introduced into Fonterra Australia.

The New Zealand brands business has recently (in late September / early October 2013) completed a switch over from legacy ERP systems to the same SAP systems as Fonterra Australia.

The NZMP and NZ Brands/Fonterra Australia SAP systems are not compatible and the ultimate aim is for the NZ Brands/Fonterra Australia SAP system to be the global system that is rolled out in all regions, including for NZMP.

Trace back: summary

The detailed trace back process did not start until after the mouse bioassay results were received on 31 July 2013. And it was not until early on Sunday, 18 August 2013 that Fonterra had traced all affected product. There were significant variances in the volume of affected product found over the initial investigation period (1 August through 5 August), and other more minor discrepancies were identified over the course of the next fortnight. The most notable variance was the initial advice from Fonterra Australia on 1 August that there was 229MT of affected product, as compared with the figure (provided on 5 August) which was 1,693.1MT of affected product.

The final volumes of affected product were 837.5MT (New Zealand product – finalised on 8 August) and 1,757.5MT (Darnum product – finalised on 18 August).

The main tracing difficulties were:

- tracing through to customer systems for ex-New Zealand product. There is no one integrated system through to the end retailer which enabled an easy trace back;
- the manual nature of the JDE Australian system that was in use at the time of receipt and manufacture for most of the WPC80 product. That manual system resulted in transcription errors;
- incorrect assumptions that were made during the trace back process as to the volume on pallets;
- the changeover in Australia on 1 April 2013 (part way through the manufacture process) from JDE to a new SAP system. That changeover led to difficulties in identifying pallets, and particularly pallets which had been divided for airfreight or shipping with the result that some pallets were assumed to be "dummy pallets" and so were not counted initially; and
- in Australia, the lack of any trace back procedures or experience in trace back exercises.

The New Zealand experience

The New Zealand trace back was complete by 8 August 2013 with 837.5MT of product identified. The majority of the difficulties with the New Zealand trace back process were in identifying the correct volumes of customer product (being Customer B and Customer C product).

The errors in the initial New Zealand trace back were identified by an operational team (led by a solutions architect) that (between 6 and 8 August) conducted a detailed review of all stock movements, starting from production. That team identified pallets that had been split, and bags that had been removed from pallets which the initial team had missed. This led to the identification of the final bag of product (being a 25kg bag of WPC80) which had been sent to FRDC after which part of it went to Palmerston North Girls' High School.

The detailed results of the New Zealand stock movements were presented to an MPI team in Wellington on 9 August 2013.

The Australian experience

The Australian trace back was completed on 18 August with 1,757.5MT of product identified.

There were numerous difficulties with the Australian trace back, and there were significant variances in the identified volume of affected product over the initial period (1 August through 5 August), from the initial figure of 229MT on 1 August through to 1,693.1MT on 5 August.

The initial trace back team in Australia was made up of a number of technical Fonterra staff. The quality team was not involved (at least in these early stages) and an SAP consultant was used in a limited way, in that he was asked for specific information but was not briefed on the context as a whole. Those involved had not had experience with trace back in the past and they did not necessarily have detailed knowledge of the JDE and SAP systems, including managing the link between those systems.

On 6 August, further resource from Project Catalyst was added to the Australian trace back team. That further resource was able to identify product that had been missed as a result of pallets having been split for

the purposes of airfreight. It also identified an incorrect assumption made by the initial team as to the volume of product on pallets. The team had assumed 56 bags per pallet, when in some cases there were only 55 bags, which made a difference to overall tonnage of affected product.

On or about 15 August, additional resource was also sent to Australia, being the Solutions Architect from the New Zealand operational team which had conducted the detailed review of NZ stock movements. The same detailed review exercise was completed in Australia, which resulted in further product being identified. That additional product was initially thought to have been "dummy" pallets as a part of the changeover from JDE to SAP.

The JDE system caused a number of difficulties for the Australian trace back. For the most part, those difficulties were transcription errors in the manual parts of the process. Both pallet numbers and volume of product had been incorrectly transcribed (whether the result of a simple error, or difficulties in reading handwriting). Those difficulties would have existed irrespective of the changeover to SAP.

The changeover to SAP added in a further level of complexity, and the initial team involved had not identified pallets that had been split and given new pallet numbers once they entered into the SAP system.

Since the WPC80 issues were identified, the Australian team has developed a detailed trace back procedure, and a specific trace back procedure for airfreight product. The core Australian team has been trained on airfreight procedures and Australia is in the process of developing training for all staff in trace back generally.

The internal Operational Review (4 September 2013) records that the Australian trace back process has been audited recently by an external party. That external party chose a product at random, and the trace back exercise was completed within 44 minutes (as against a target of four hours).

APPENDIX E

OVERVIEW OF PRODUCTION PROCESSES

Jacob Heida

General overview

I was appointed to the Inquiry team to complete a technical review of Fonterra's production processes, particularly in relation to good manufacturing practices, environmental regulations, cleaning and testing practices. In particular, given the events of the WPC80 crisis, I was asked to review Fonterra's production of whey and nutritional products.

As part of my brief, I have visited 8 Fonterra sites which produce nutritional ingredients and/or products, as well as other products. Those sites (listed in no particular order) are:

- Hautapu (Central Waikato);
- Lichfield (Central Waikato);
- Waitoa (Central Waikato);
- Canpac (Central Waikato);
- Kauri (Northland);
- Maungaturoto (Northland);
- Clandeboye (South Island); and
- Darnum (Victoria)

At each site, I conducted an operational and quality review. My site visits involved walking through each plant to observe the machinery up close and to review the processing steps (including plant cleaning) undertaken by plant operators. Further, I had detailed discussions with site managers, plant managers and quality co-ordinators to get insight into the management, the level of performance and compliance with food quality systems.

Each of the sites I visited has Risk Management Plans (RMPs) and Hazard Analysis and Critical Control Points (HACCP) plans, as required by law, which are audited by the Regulatory Authority, AsureQuality. All plants are audited by AsureQuality quarterly, and also audited annually or bi-annually by a range of customers.

Detailed cleaning and testing procedures are in place. The required samples (both product and environmental) are obtained by a combination of plant operators and independent quality staff. Testing and grading is also independent from operations.

The personal health and safety and food safety procedures are applied very strictly. Security and "red line" procedures for changing clothes and footwear are up-to-date.

Quality test results (both physical and microbiological) and "First Time Right" figures are at a good level (consistently over 95%), from what I have seen.

In general, I can say that Fonterra is operating in a way expected of a good producer of nutritional products.

Events leading up to the WPC80 crisis

The events leading up to the WPC80 crisis have been covered in detail in a separate "Narrative and Decision Points" section of the Inquiry's report. That document provides the context to my recommendations.

My recommendations:

1. ***Establish sufficient food safety knowhow within the Fonterra organisation.***

   Events leading up to the WPC80 crisis suggest that Fonterra did not have a good understanding of the food safety risks of *C. botulinum*. Historically, there has been no evidence that *C. botulinum* presents a problem in dairy products.

   Further, within Fonterra, there appears to have been little knowledge of the testing procedures for *C. botulinum* and the botulinum toxin (*BoNT*). Fonterra should review its procedures to ensure that testing is outsourced to properly accredited laboratories and that results are peer reviewed.

2. ***Implement a food safety and quality culture within the TOTAL organisation, which would be at the same level of emphasis as health & safety.***

   It is impressive to see the dedication to the occupational health and safety drive across all levels of Fonterra. Procedures and rules relating to health and safety are diligently put in practice.

   It should not be difficult to approach food safety and quality with the same level of emphasis. In practice (i.e. on the factory floor), although health and safety is not given significantly greater importance than food safety and quality, it is clear that food safety and quality does not yet have the same number one priority (as Fonterra's executive team has said it should be). A good starting point to making food safety and quality the number one priority would be to ensure that it has equal standing (visually) with health and safety on the Daily Management Systems boards reviewed by each shift and management every morning.

   Also, model behaviour by management is very important. The first reaction to a customer complaint should not be about loss of money, but rather it should be looked at as an opportunity to solve a problem for a customer and to build a relationship with them.

3. ***Review the implementation of the Change Control Procedures (should be established and compliance enforced Fonterra wide)***

   In the nutritional products business, it is critical that production takes place in accordance with established procedures, given the at-risk nature of the end customers (infants).

   If any changes are to be made to the process, all risks and consequences (particularly food safety) must be considered. The established Change Control Procedures are a good starting point for this. Ensuring that all levels of the Fonterra business follow the Change Control Procedures must continue to be a major focus.

4. ***Apply acid cleaning when production systems have not been used for more than 24 hours.***

   Fonterra has established cleaning procedures for each plant. The specific procedures vary depending on the plant and the nature of production which has taken place, and which is due to take place.

   The WPC80 crisis stems from the Hautapu plant deciding to use a pipe in the system which had not been used for at least two years. No acid clean was applied, only a double caustic clean.

   In my view, it would be best practice to require plants to perform acid cleaning on any equipment unused for over 24 hours.

5. ***Use of flexible hoses should be avoided in production processes (and particularly in processes involving nutritional products).***

   Where possible, use of (plastic) flexihoses should be avoided in dairy processing. Stainless steel can be cleaned better than plastic hoses at appropriate temperatures.

6. ***Review all the specifications related to infant food products or ingredients with respect to SRC testing/food safety demands.***

   In my view, it was not logical that Fonterra did not have an SRC standard for ingredients used for the production of Customer A's infant formula base powder, when the end product base powder contained an SRC standard.

   Following the events of the Hautapu WPC80, an SRC standard for WPC80 has been established.

   I would recommend that Fonterra (possibly together with its customers) conduct a wider

review of the specifications of all ingredients for nutritional products, and the nutritional products themselves. The review should take into account all relevant food safety demands.

Fonterra's starting point should be the highest customer demands in order to be the "Top of the Class".

7. ***Develop best practice regarding rework of nutritional products.***

The starting point for the best practice procedure for rework is the existing chapter 5.4.13 of the Fonterra Quality Standards. Further to that document, a "best practice" guide should be developed in relation to rework, and particularly in relation to rework of nutritional products.

The best practice guide should address rework in relation to all potential types of defects (bacteriological, compositional and others), and the key "Do's" and "Don't's" of rework.

The collective knowledge of all Fonterra sites should be used as part of this process. For example, Fonterra Darnum's experience of working closely with Danone would be invaluable to other sites.

8. ***Create a hierarchical line between the National Quality Manager and the Group Director Food Safety and Quality.***

It is important that the quality organisation be independent from the operations team. At plant level, I have no concern about this. Testing and grading of the end products is organised by the independent quality organisation (with the exception of Darnum).

But, above plant level, the position changes. National quality leaders ultimately report to supervisors within the operating structure. There is potential for issues to arise if certain quality issues need to be escalated, but can only be escalated to senior operations staff.

To resolve that potential issue, I would recommend creating an independent escalation route which allows the national quality leader to escalate and directly report to the Group Director Food Safety and Quality instead of senior operations staff.

9. ***Install bactofuges if you want to be "Top of the Class"***

The purpose of installing bactofuges is to remove spores from milk. In particular, milk directly used for infant food production, or milk used for cheese production, could be run through bactofuges in order to get less spores in the whey product.

Fonterra should conduct its own research into whether installing bactofuges in the different production lines would create an improvement in terms of quality. In my experience, it would, particularly in the case of nutritional products.

However, starting from the proposed WPC80 specification of 100 cfu/g and regarding the actual SRC levels in WPC production in 2012 and 2013, installing bactofuges may not be immediately necessary for WPC80 production.

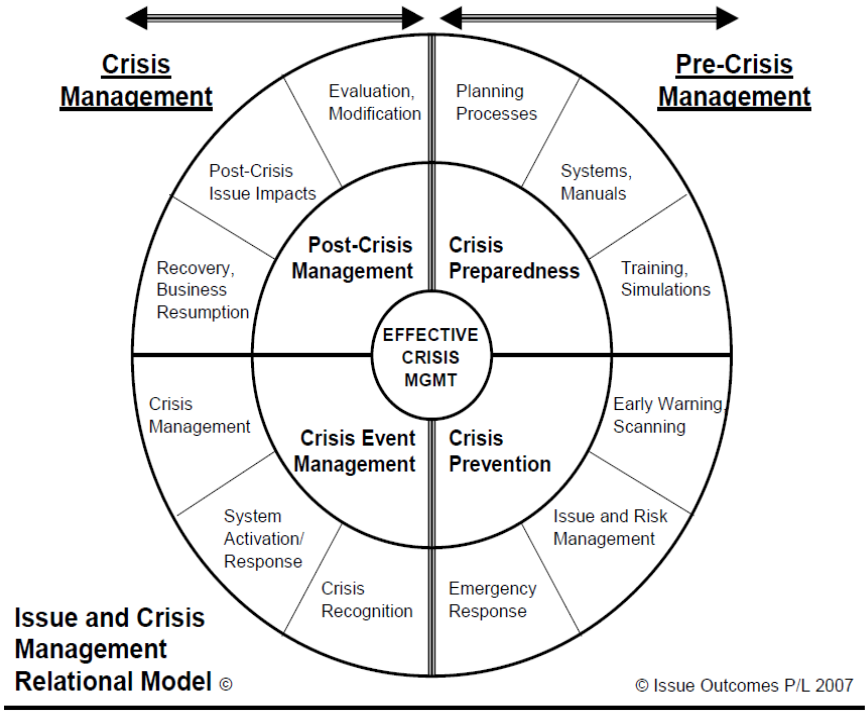
APPENDIX F

CRISIS MANAGEMENT READINESS

Contents

Model of crisis management

Contemporary models of crisis management refer to the need to think in a broad and systemic way about the management of crises. Rather than a simple focus on the events which led to the crisis, and the tactics employed in responding to the crisis itself, the actions afterwards are seen as vital to preparing for and managing future crises. The model developed by Australian Dr Tony Jaques, set out below, illustrates this approach.



(Jaques, Dr Tony. *Issue Management and Crisis Management: An Integrated, Non-linear, Relational Construct* Public Relations Review, 33(2), 2007, pp 147-157)

As the Inquiry has noted on a number of occasions in this report, Fonterra is a very successful global enterprise for good reason. It has excellent systems and processes, high quality governance, leading dairy processing technology and food science, deep management talent, highly committed people and many years of knowledge and experience.

But Fonterra's crisis management capability is an area for improvement, as already identified in Fonterra's internal Operational Review of the WPC80 episode. Fonterra's management of the WPC80 crisis fell short of what one would expect from a business of such standing and with its record of success.

It should be recognized that there was almost universal commendation of the commitment of Fonterra people in a crisis, and particularly the commitment to managing that crisis and acting in the best interests of those affected. In addition to the WPC80 efforts, the commitment shown by Fonterra during the Christchurch earthquakes was cited as exemplary. There was also wide agreement that once the WPC80 crisis broke, Fonterra's resources were applied unstintingly and whole-heartedly.

Substantial feedback to the Inquiry supports the view that Fonterra should systematically invest in strengthening its crisis management capacity and capability, and recognise the need for holistic thinking about this aspect of its business.

The Jaques model above provides a convenient framework against which to discuss Fonterra's crisis management:

1. Pre-crisis preparedness;
2. Crisis prevention;
3. Crisis event management; and
4. Post-crisis Management.

1. Pre-crisis preparedness - The development of Fonterra's crisis plan

Planning, systems, training

The deficiencies in Fonterra's management of the WPC80 incident were not because a crisis plan did not exist. To the contrary, a "modern" Fonterra Crisis Management Plan (*CMP*), based on some best practice examples, has been in existence since at least 2006, under the oversight of Group Risk. It appears that the tracking of updates to the CMP commenced early in 2010.

However, both common sense and experience suggest that the mere existence of a crisis plan does not ensure any crisis will be well managed. (Marra, F. J. *Crisis communication plans: poor predictors of excellent crisis public relations.* Public Relations Review 24 (4), (1998) 461-474.)

In Fonterra's case, the critical links between crisis planning and real time execution, particularly at Group level, were not strong enough. Planning and systems were in place, and regular training at business unit level was in place. But there was insufficient rigorous simulation training at group level.

The lack of simulation training was a key factor in:

- the lateness of escalation of the WPC80 issue;
- the lack of tested links with and protocols in relation to stakeholders during the crisis;
- insufficient global thinking;
- an initial ambiguity in crisis team leadership and team process; and
- a lack of pre-prepared communications tools which would have been of value immediately before the public announcement of the WPC80 issue.

- Planning/systems

Fonterra's board and management had a high level of awareness of the risk of crisis.

Crisis management risk ("*a major disaster occurring, resulting in major business interruption and stakeholder dissatisfaction*") was identified in a paper on the top 20 risks that were signed off by FMT and the Board in 2012, and on numerous other occasions in Fonterra's risk management processes.

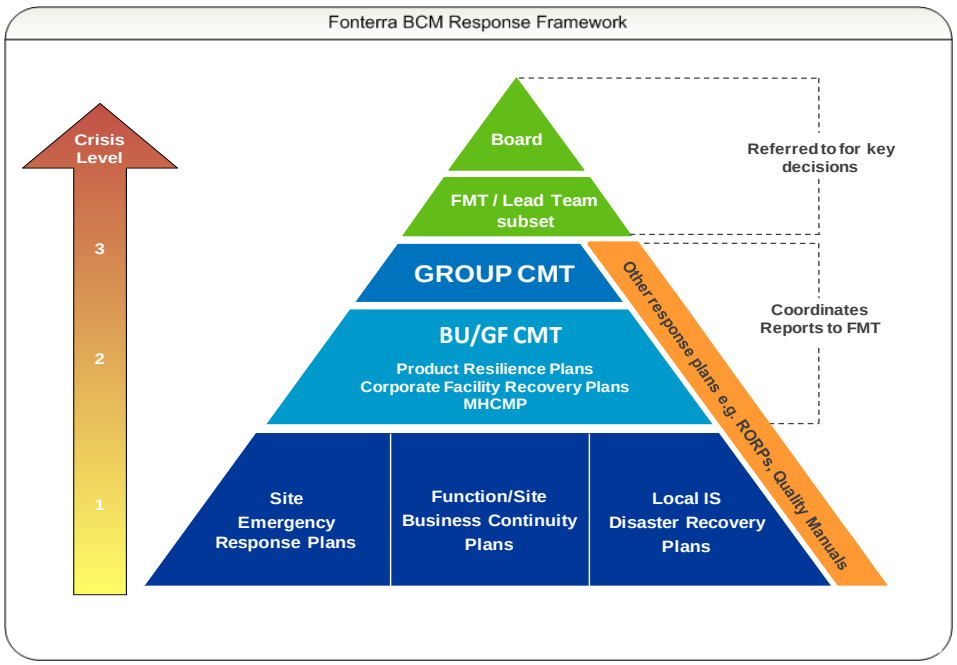
In the past three years, the Fonterra CMP has gone through a series of refinements, as follows:

Jan 2010	CMP (Version 3) signed off by previous CEO.
Oct 2011	Version 4 drafted.

Dec 2011	Version 4 provided to Fonterra Management Team (*FMT*) with CEO sign-off.
Oct 2012	Senior Management agrees on the urgent need for a refreshed crisis plan. Business Continuity Management team (*BCM*) began redraft.
Oct 2012	Version 5 in A3 format developed (8 pages).
Oct 2012	A3 CMP two page document developed.
Oct 2012	CMP Wallet card developed.
Nov 2012	Session with CEO for plan update put on hold mainly as a result of impending organisational changes.
Feb 2013	Crisis management plan appendices refreshed.
Mar 2013	FMT paper on CMP changes drafted.
May 2013	CMP refreshed to better reflect business alignment, best practice, retaining the A3 format. By this time, the DCD issue had arisen and been reviewed.
May 2013	Crisis plan appendices refreshed.
May 2013	CMP & FMT paper presented to General Counsel & Company Secretary, hand annotation version received back with feedback. Approved for presentation to (previous) CFO.
May 2013	CMP presented to Legal department (24 May). Outcome was broad approval for the revised format but advised to hold off refresh/roll-out until structural changes completed (anticipated to be September 2013), then revisit.
Jul 2013	CMP & appendices refreshed based on feedback, to be presented once an FMT agenda item is secured.
Aug 2013	CMP updated with FMT role/personnel changes.

At the date of this report, the Fonterra Group Crisis Management Team (*FGCMT*) consists of the Fonterra Management Team (FMT), subject matter experts and various support roles across the Group.

A planning and response framework exists as follows:



- Training: Business Unit crisis simulation exercises/tests

There are a 124 individual Business Continuity plans (which include crisis management) for direct Fonterra business entities (excluding Fonterra joint ventures and third parties) and 7 Crisis Management Plans. Compliance is recorded on a quarterly reporting card and rolled up into a readiness score, which is reported to all business unit Commercial Directors.

Crisis management exercises at Fonterra are undertaken in accordance with the standards and guidelines that are outlined in the Risk Management policy and contained in the Group CMP. The Group CMP is administered by the FGCMT.

Business unit level crisis tests have been taking place at Fonterra for at least the last seven years.

The BCM guidelines provide a detailed methodology for creating continuity testing scenarios that are broken up into 3 types (desktop, simulation and hard test) with four main components - planning, preparation, running the test and post-exercise.

The requirement in the BCM guidelines is for annual testing of BCM plans and 6-monthly updates of contact data. Fonterra's central Risk Management area has not traditionally overseen or monitored business unit crisis exercises, in line with the devolved management style of the business.

An example of a group-wide crisis test was a brief, high level desktop exercise on 14 December 2007. The test centred on a biosecurity scenario involving a Waikato farm delivering contaminated milk to the Waitoa facility. The exercise lasted for 2 hours followed by an hour-long round table debrief session and "SWOT" analysis (analysis by reference to Strengths, Weaknesses, Opportunities and Threats).

A review by the responsible executive team on 23 January 2008, made several recommendations around improving aspects of the biosecurity tests.

The review found that the exercise response team had some knowledge of protocols, work already undertaken or in progress within the business to mitigate bio-security incursion threats, such as the Exotic Disease Response Plans (EDRPs) developed for manufacturing sites. It was agreed, however, that the team needed to obtain a more comprehensive knowledge of any such plans or relevant areas of work. Such knowledge would be beneficial in ensuring any future strategy or overarching plans developed are complimentary to existing efforts.

The NZ Milk Products (*NZMP*) Operations Team has also undertaken annually some scenario testing exercises jointly with the Ministry for Primary Industries (*MPI*). . However, Fonterra's Risk Management team has no engagement with or visibility of those testing exercises. Responsibility for those exercises has been with the NZMP Milk Supply Technical & Assurance area.

Another scenario test example was "Exercise Taurus", a national bio-security exercise driven by the Ministry of Agriculture and Forestry (*MAF*) on 19-22 March 2012. Fonterra's Risk Management team and others were involved in this exercise. This focussed on MAF's internal processes and their role as a lead agency in a "Whole of Government Response", but excluded field operations and industry integration. From a Fonterra perspective, this meant there was limited opportunity to participate or identify concerns around the flow of information and coordination of actions between MAF, Government and industry.

Apart from the 2007/2008 corporate bio security tests, there have been no Group-level CMP tests because the annual testing requirement in the CMP has been completed via real events, such as the recent dicyandiamide (*DCD*) recall and WPC80.

It is a requirement of the Business Continuity standard for business units to test their plans annually. This is an essential component of Fonterra's operating model, as it cannot facilitate testing of each business continuity/crisis management plan at Group level.

In the May 2013 update to the Group CMP, it was noted that Group Functions would be given the option of developing the equivalent of a business unit crisis management plan. Considerations that may suggest the need for a Group Function CMP include:

(a) reasonably foreseeable scenarios that will require a coordinated response across multiple divisions within the Group Function regularly; and

(b) the need for availability of large volumes of staff in the event of a low likelihood incident (e.g. Swine flu);

(c) difficulties of coordinating a crisis response without a structured crisis plan in place.

The changes to the Group CMP included:

(a) Alignment to business structure, terminology and personnel;

(b) Requirement to conduct a risk assessment as part of the initial crisis meeting;

(c) Update to the new A3 "operational effectiveness" format;

(d) Removal of appendices into a separate document to make the base CMP smaller and easier to use;

(e) Inclusion of a full stakeholder listing in the appendices to assist in developing crisis communication strategies; and

(f) Requirement to consider NZX disclosure implications.

- Communications

Historically, the Fonterra Group Communications Team has not played a direct role in business unit testing because of the significant volume of tests occurring each year, the geographical spread and the practicalities of servicing them. The Communications Team is involved in the Recovery Director training and has a dedicated module in that training event.

The Recovery Director training has been a ½ - ¾ day session, with the Communications Team providing a person to provide a short module on crisis communication. This module is approx 30-45 mins in length.

In addition, the Company has used a contractor (not a usual member of the Communications Team) to provide a 2-3 hours session on crisis communications and some 'hands-on' scenario role-playing to give a high level appreciation of the subject. This is not "media training" for a crisis, but an overview of the dynamics of the media and communications management in a crisis. General/specific media training is provided for all senior executives, but the Group Risk team does not have visibility of or involvement with that process or programme.

The Communications Team does not have its own CMP but relies on the communications guidelines that are outlined in the Group CMP.

- Group involvement in offshore exercises

There have been two tests undertaken by the Group Risk Management team in Japan. One involved a test based around an earthquake in November 2011 (after the March 2011 earthquake – a live crisis event managed very well by Fonterra in its Japanese business unit) and another in May 2012. An exercise document and post-exercise debrief was prepared for 2012 event. The global sales team in Japan undertook their own test on 22 May 2013 and completed an exercise report. That test was related to a scenario of milk supply disruption because of an explosion at a warehouse and factory.

2. Crisis Prevention

Scanning, Issues Management, Emergency Response

Fonterra's Food Safety and Quality Council (*FSQC*) is an organisational body capable of identifying, monitoring and managing emerging issues. The FSQC's focus is on food safety and food quality issues that arise in the businesses, largely from a scientific viewpoint. It did not see itself as a body with responsibility for crisis management.

More recently, Fonterra's internal Operational Review has indicated that a new Food Integrity Council (*FIC*), has been established from 23 August 2013, with a broader remit. This will be chaired by the newly-created position of Group Director Food Safety and Quality. It will combine the FSQC, the Global Sustainability Leadership Group, the On Farm Innovation Council, the Fonterra Reputation Council and the Social Responsibility Council.

Several best practice global firms, particularly in food industries, have a permanent, multi-disciplinary group Incident Management Team (*IMT*) whose role it is to assess emerging issues for their potential to develop into critical incidents. The IMT then has a role in "worst case" scenario planning, enlisting specialist expertise where necessary and preparing plans for stakeholder engagement and tactical response. Typically, this team would work closely with the Risk Management system in the organization, from board through to operations. The IMT has a strong role in ensuring that regular and complete crisis simulation exercises are carried out,

evaluated and learnings captured into a continuous improvement cycle (see Dr Tony Jaques' model).

While it seems probable that the FIC will strongly link scenario planning to the management of emerging issues, the Inquiry has recommended the establishment of an IMT for Fonterra at Group level which would work closely to ensure crisis preparedness and emerging issues are inextricably linked, and that there is a constant crisis readiness focus at Fonterra Group level

3. Crisis Event Management

Recognition, Activation, Management

The WPC80 recall was publicly announced just after midnight on August 3, 2013, but the work done in planning, testing and review of previous events, particularly at business unit level, did not translate into well-executed crisis event management.

Adequate full-scale Group-level crisis training, involving government/regulatory and customer participants, would likely have addressed the importance of appropriate protocols and capabilities in communications, including best practice risk communications messaging. This lack of training put Fonterra into a position where it could not effectively maximize the "Golden Hour" of a crisis (the first 24 hours). Many stakeholders who would have expected to hear about the events directly from Fonterra heard through the news media instead, and news media themselves entered the process with scepticism at a statement that had been released after midnight.

The quality of the effort in the first critical 24 hours was impaired by the belated recognition of the potential for the WPC80 contamination problem to erupt into crisis, the current need for consequent "worst case scenario" planning to have been done in advance, the belated escalation of the event to Group level and the imperfect tracing information,

Supporting documents at Group level were not complete or operationally deep, including on the communications side. The lessons from the DCD incident considered by the FMT and the Board in May 2013 had not been fully acted upon. Basic signs of readiness such as a ghost website did not exist, nor did manuals containing templates for communications materials capable of being to be speedily adapted. Translations of materials in critical markets were 24 hours behind the news cycle as they were not done simultaneously with the development of the communications materials in Auckland.

Nonetheless, many committed people worked tirelessly to get control of the fast-moving crisis as alarm spread. They acted professionally in trying to assemble the facts and communicate them appropriately. The decision-making during the crisis, notably after the initial weekend, was basically sound.

Particularly in overseas markets, the initial alarm was very difficult to address. It took significant effort from Fonterra, the New Zealand government and regulators to establish a coherent way of working together. The initial difficulties in working together were compounded not only by the initially imperfect tracing data, but also by various pieces of misinformation. Problems along these lines developed not only in China, but Fonterra's resources were also stretched dealing with regulators in Russia, a product ban in Sri Lanka and concerns in Vietnam.

To compound matters, social media lent "wildfire" dimensions to the alarm (see further details in Appendix G).

As information about the whereabouts of the potentially affected product became clearer (though not perfect), so, too, Fonterra's control of the issue improved. Communications channels and crisis team management were clarified, the personnel involved were split into governance and operational streams, customer issues were being addressed, a web microsite was in the process of being developed and stakeholders were receiving regular communications. (See Section 2 of this report for further details of these events.)

By 8 August, the Fonterra Board announced the Inquiry, and Fonterra's CEO announced the internal Operational Review.

Small critical incidents developed within the crisis, as is typical of many crises. For example, on 9 August it was necessary for Fonterra to put out a media release confirming there was no health risk experienced at a New Zealand high school which has received a small amount of the potentially-affected product for a school project several months earlier.

4. Post-crisis Event Management

Fonterra felt in a position to announce its Recovery Team on 12 August, and on 28 August, the announcement of the "false positive" result was made by the Ministry of Primary Industries. A week later, the findings of the Operational Review were released (see Appendix J).

Fonterra has the measures announced in its own Operational Review and others already underway and shows every sign of embracing the recommendations of this Inquiry and any further Inquiry findings that will improve its business performance.

Recommendations for Improving Crisis Management

Having examined many facets of the WPC80 crisis management, the Inquiry has used its judgement and experience in this area, as it has in others, to develop recommendations for the Fonterra Board. It has not attempted to articulate every aspect of the background and reasoning behind them.

- Fonterra should undertake major crisis exercises at the corporate level at least once, and preferably, twice a year. Such exercises should involve the Board of Directors and be anchored by proposed Incident Management Team (see the Recommendations section and Section 1 of this report for more detail) and the communications team. This exercise should include scenario testing of international product recall procedures and high-level media engagement.

- Key stakeholders – government/regulators and customers across jurisdictions – should regularly be engaged as part of the corporate level simulation exercises. These joint exercises will improve the development of protocols, identify non-alignment and strengthen relationships.

- Group Risk Management should integrate its work with the proposed permanent Incident Management Team. Both IMT and Group Risk Management should have oversight of scenario tests undertaken by the individual business units to ensure consistency, to advise on processes and ensure learnings are captured into a continuous improvement cycle.

- The Fonterra Group Crisis Plan should be simplified, where possible, and be clearer on the key principles and supports for the establishment of the crisis response team:
  - Senior executives need to have appropriate delegations to act promptly and make clear decisions;
  - Immediate access to information and data for decision-making;
  - The establishment of a dedicated IMT crisis centre and the establishment of a specialist crisis communications network across the group;
  - Appropriate IT system and support for logging and tracking queries and an appropriate inbox address to which queries can be directed;
  - Development of a short "induction pack" for ad hoc internal recruits required toassist with the crisis effort;
  - Flexibility to combine analytical and creative skills with rapid, focused decision making and action; and
  - Minimum paperwork flow to avoid slow responses and internal red tape.

- Important recommendations on the style and substance of Fonterra's messaging and communications during the crisis and generally are contained in Professor Hallman's report in Appendix H. Fonterra's communications team should adopt the principles of international best practice risk communications, which provide learnings on specialist methodology for communicating risk in a way which enhances trust and credibility.

- The communications team needs its own crisis management document that dovetails with the Incident Management Team. This document needs to contain templates for all potential scenarios such as product recalls, major health scares, plant closures, natural disasters and similar.

- External experts should critique each major corporate crisis test and prepare a report for the CEO and the Board Risk Committee, commenting on procedures and recommendations for improvement.

- Media training for crisis exercises should be overseen internally with support from external experts as and when required.

- The Communications Team should ensure it takes a global perspective on how and where coverage and commentary during critical events unfolds and the speed with which it spreads.

- Expert translation services, available 24/7, should work with the IMT and Communications Team so that virtually contemporaneous foreign language communications materials can be developed without delay.

- Scientific advice on health and safety issues should be part of the IMT's resources. Appropriately media trained scientific experts should be part of and available to the IMT to demystify complex data and scientific terms. Fonterra should have a pool of experts across various specialisations readily available.

Case Study

Maple Leaf Foods: Crisis Management Containment

Gwyneth V. J. Howell, University of Western Sydney & Rohan Miller, University of Sydney Public Communication Review, Vol. 1, 2010, 47.

Accessible online at:

https://www.google.com.au/search?q=PUBLIC+Communications+Review+2010+maple+leaf&oq=PUBLIC+Communications+Review+2010+maple+leaf&aqs=chrome..69i57.17960j0j7&sourceid=chrome&espv=210&es_sm=91&ie=UTF-8

Howell and Miller's case study assessed, against best practice standards, the crisis communication management approach taken by Maple Leaf Foods, a Canadian company, following an outbreak of *L. monocytogenes* in a line of ready-to-eat meat products, during the northern summer of 2008. The case study found that Maple Leaf adopted best practice in its handling ofthe outbreak, and particularly in its transparency and messaging. .

APPENDIX G

SOCIAL MEDIA

Contents

Fonterra Social Media

Fonterra has recognized, and is taking steps to address, its immaturity in adopting a sophisticated social media presence, as it evolves from its self-image as a B2B (business to business) enterprise to a more B2C (business to consumer) global focus.

It currently runs a Twitter handle (having joined Twitter in May 2010) and LinkedIn company profile, both of which show limited activity and low two-way engagement with key influencers or the general public. Fonterra has an unauthorised Facebook with over 6000 'likes', over which the company has no control. Its Twitter account usage is largely unilateral, seen as a "compliance" channel for issuing statements, rather than an evolved two-way engagement, with the audience in mind.

> *"The purpose of Fonterra's Twitter use was very narrowly focused on news and updates (88%), and for the most part used as an additional avenue for conventional public relations communication. None of Fonterra's tweets ranged outside its core business, with the exception of one isolated item of 'chatter' in early January.*
>
> *The specific issue focus of Fonterra's tweets leaned towards updates on company finances and ownership issues (21 tweets), and specific CSR/sustainability initiatives (19 tweets on Milk for Schools programme). The latter initiative was also the subject of three of the rare retweets….*
>
> *"There did not appear to be a targeted audience, nor was there any attempt to build awareness or develop any engagement with other users."*
>
> Edmonds, P. (2013). ***Twitter Use in New Zealand Agriculture Organisations.*** (Unpublished post-graduate dissertation), Massey University, Palmerston North, New Zealand.

As that quote from Edmonds points out, there is at present a lack of empirical research that supports short or long-term financial benefits to an organisation from using Twitter. What is clear, however, is that in a crisis a lack of a social media strategy and built capability can be costly in terms of both reputation and remedial opportunities. This is particularly so in a market such as China which has high usage of social media as a communications channel.

In Asia generally, which includes some of Fonterra's key markets, there is very limited capability for Fonterra to engage with social platforms, both at an operational and resource level. Language provides a major barrier.

China - A Special Case

Internet usage has expanded more quickly in China than anywhere else in the world.

In 2013, a McKinsey & Company report estimated that China had 593 million Internet users, compared with 67 million in Germany, 121 million in India, and 245 million in the United States (Exhibit 1).

More significantly, it is social media use that is exploding across China with active accounts fast approaching 600 million – almost twice the total population of the USA. McKinsey estimates that China's social media users spend an average of 46 minutes every single day accessing social media sites; added together, this means social media users spent at least 167 billion hours – some 19 million years of human time – on social media activities in 2012 alone.

Unlike the West, where Facebook, Twitter and YouTube reign supreme, China's social media landscape is dominated by platforms operated by homegrown internet company Tencent. Counting users on its Qzone, Tencent Weibo and Pengyou site, Tencent claims to host around 56 per cent of the country's active social media accounts, and QZone is home to at least half of Asia's total social media population:

The McKinsey research, based on a survey of 5,700 Internet users in China, indicates that while messaging and sharing photos is as popular in China as in other regions, one aspect of usage in the country stands out: *social media has a greater influence on purchasing decisions for consumers in China than for those anywhere else in the world*. Chinese consumers say they are more likely to consider buying a product if they see it mentioned on a social-media site and more likely to purchase a product or service if a friend or acquaintance recommends it on a social-media site.

The contrary is also true. If consumers see negative mentions of defective, shoddy or contaminated products - whether true or perceived - the potential for reputational damage is immense and may create a situation from which an affected company or product may takes years to recover.

This can be explained in part by a cultural difference: *Chinese consumers prize peer-to-peer recommendations because they lack trust in formal institutions*. In general, the Chinese populace is sceptical of information from news sources and advertising - people rely more on word-of-mouth from friends, family, and key opinion leaders, many of whom share information on social media.

Research by Singapore's Social Media Today network suggests that 28 per cent of Weibo users actively search for brand information in Weibo, and 50 percent of all Weibo users claim to visit e-commerce sites after noticing relevant information in posts by their peers. These posts often include online product reviews, critiques on the latest in technology and services, and a remarkably vocal group of consumer advocates who don't hesitate to condemn products they consider shoddy or substandard, faulty or which pose a health safety threat.

Chinese bloggers also enjoy huge audiences. For example, Laoluo, a language teacher who has 1 million followers, frequently writes about defective products and technology.

These numbers have inspired nearly a quarter of a million companies to set up a Sina Weibo account, and 25% of Fortune 500 companies – primarily companies based in the West – already have a presence on China's most active Weibo platforms.

Thus the extraordinary influence exerted by social media in China is critically important for companies like Fonterra looking to engage the vast and increasingly affluent online audience that uses social media as a vital source of information and more importantly communication.

Crisis? What Crisis?

"If your company finds itself in a crisis, and you have not prepared your social media network well in advance for the eventuality, this could be your death knell".

The Definitive Guide to Managing the Message, Stephen Fink, *McGraw Hill, NY 2013.*

As in the immediate aftermath of Fonterra's DCD issue earlier this year, there was significant coverage of WPC80 precautionary recall in China's social media - much of it in the first two days, then continuing with another spike about two weeks after the announcement – which was negative and damaging to the company's reputation. Some messaging acknowledged that Fonterra had "done the right thing" with the precautionary recall, but after considerable anxiety, criticism and resultant reputational damage.

In the wake of the DCD incident, an internal audit by Fonterra (in April and May 2013) recommended the "establishment of a clear corporate position on how to manage and response to non-traditional media". For a variety of reasons this recommendation has yet to be fully acted upon by the Fonterra Management Team, though the need has been well identified.

Internal and external stakeholders interviewed following the WPC80 event acknowledged that in terms of the China market in particular, Fonterra did not have in place an appropriate social media strategy to deal with the overwhelming negativity, the call for additional accurate information or any means of addressing the myriad damaging claims being made about Fonterra and Fonterra's customers' brands.

Despite the lessons identified from the DCD incident, there was no "crisis-ready" ghost site that could constitute a Chinese language crisis-specific microsite ready to go and to which consumers could be directed to access additional information and updates in relation to the recall. In China, Fonterra's social media strategy had been outsourced to a third party local Chinese firm. However, Fonterra's consumer brands digital marketing teams felt they had no alternative but to take belated control of the social media strategy so to minimize further reputational damage.

China's state controlled media (Xinhua, CCTV, People's Daily etc) seemed to "go in hard" against Fonterra's handling of the WPC80 recall. Without a channel into China's Propaganda Department, which has the power to direct official coverage of events and the sentiments expressed, there are severe limitations to how Fonterra can influence coverage in traditional media.

However, "a comprehensive social media strategy is the greatest tool a company can use to leapfrog traditional media and utilize non-traditional media to get its messages to its consumers and constituents in a direct, highly targeted, unfiltered and unedited way. The importance in China of being able to communicate directly with consumers and customers alike during a crisis cannot be overstated." (Fink, 2013)

Some stakeholder interviews suggested that Fonterra has positioned itself as a "faceless corporate", being a "B2B" player and not a brand. But the Sanlu melamine contamination scandal, the recent DCD incident and the WPC80 event have put the Fonterra corporate brand clearly in the forefront of Chinese consumer minds. As noted in the internal audit report that followed the DCD incident, Fonterra clearly needs a Group strategy in relation to social media. It also needs to recognize that China is a unique market and that a "one size fits all" strategy is unlikely to meet the demands of Chinese online consumers.

Having a local strategy and approach, while keeping aligned with the overall group view and positioning, is critical. It is essential that Fonterra learns "the rules of the game" in China's social media and engage consumers accordingly, while at the same time building relationships and engaging with key influencers and opinion leaders before (perhaps inevitably) some other crisis is encountered.

While non-traditional media will be increasingly important in all markets in which Fonterra operates, China is unique because of the overwhelming influence of social media compared to the cynicism associated with the traditional State-controlled media. It consequently deserves priority. Any approach to social media strategy in China demands an in-house senior strategist supported by a dedicated digital marketing team. An ad hoc or outsourced solution in a market that consumes 20 percent of Fonterra's milk solids product seems an inadequate application of resource.

Social media moves at lightning speed in China with nearly 80 million messages posted every hour on average and therefore requires an active strategy.

It is critical that outside of crisis periods, the Fonterra corporate brand develops an human face and begins a dialogue with its audience - two-way conversations that involve consumers, rather than monologue. It should engage on topics that are of interest - post-natal care, child health, diet and exercise determined by observing discussion topics in consumers' posts. Not only is this a demonstration of openness and willingness to engage, but it has the benefit of creating a message distribution footprint which can be usefully employed in times of crisis.

Additionally, Fonterra needs to actively identify and engage key influencers in China's social media sector in order to create positive experiences and encourage them to be advocates.

In a crisis, an appropriate social media strategy would allow Fonterra to talk directly to affected consumers, explaining the issue, what the company is doing to address it and what is being done to protect public safety. The distrust by many in China

of traditional, especially State-controlled media, makes it important that Fonterra establish a "trusted voice and a human face" in the social media landscape so that it can create a reservoir of goodwill that will pay dividends in overall crisis management communications.

Fonterra's Response

When the WPC80 crisis broke, Fonterra was ill-prepared to deal with any online escalation of the issues. Fonterra did not have a social media crisis communications plan to follow, nor a designated social media manager in daily control of digital strategy, and so the reaction was minimal, delayed and inconsistent.

Fonterra was unable to engage with the key online influencers - which in this case were mostly agriculture bloggers and customers - because it had not built a platform capable of engaging, nor a track record with the online community of being open and engaging.

When making the first announcement about a potential C-Botulinum contamination on Saturday 3 August, Fonterra's only engagement with their online community was to tweet the headline of their media releases, with links to their website for further information. There was no 'ghost site' to serve as a speedily activated issue micro-site during the crisis, (much less in relevant languages) and there was no access to the Fonterra website to upload or change information until Monday 5 August.

Once Fonterra's micro-site went live, albeit one week after the crisis had already made international headlines, it was extremely well structured. It included a filmed message from the CEO, an FAQ (frequently asked questions) section, contact details and all of the up-to-date information on the crisis. Had this been prepared, at least in part, prior to the 3 August 2013 announcement, Fonterra would not have been on the "back foot" when responding to the crisis. Various media appearances during the crisis, including CEO Theo Spiering's 10 August interview on TV3's *Campbell Live*, were uploaded by Fonterra to YouTube.

Fonterra's consumer brands are more digitally focussed and do have more structured, active social media strategies, including monitoring. At group level, Fonterra largely outsources its social media and monitoring to locally engaged PR companies in each territory.

From the moment the announcement was made, Fonterra's Communications Team was monitoring social media manually, using some of the available social media monitoring apps. For an issue of this scale and potential magnitude, it was impossible to comprehensively analyse and absorb and if necessary, react to the myriad materials being published online. Not only would it be difficult to keep up with the flow of dialogue 24 hours a day across the 100 countries into which that Fonterra's products are sold, but there is unlikely to have been access to reliable search functions on all social media platforms.

As soon as the decision was made to recall products in foreign markets, a specialist social media monitoring agency with the access and expertise to handle the volume and geographical scale of this issue would have added significant value.

In the week commencing 5 August, the Communications Team was instructed to engage with influencers on Twitter, to make sure Fonterra was seen to be communicating with the public, answering questions and offering advice. This task was not completed, with the reasoning given that there were no direct messages sent through to Fonterra, nor any questions or comments online that were direct enough to prompt engagement. So the only interaction on Twitter continued to be the announcement of media releases.

This modus operandi was clearly insufficient for a time of crisis, and this action is an example of the inefficiency of manually monitoring twitter for mentions. There were numerous queries made of Fonterra both within New Zealand and across the markets globally that could have been a catalyst for further online engagement, as well as thousands of comments, questions and accusations being made of the company within Asia. Fonterra's "voice" was absent, until after the false positive announcement on August 28 when it became apparent online that locals in New Zealand had taken up the cause to defend Fonterra within their personal networks, some spreading into Asia, ensuring people that the products were safe.

As Fonterra does not have a corporate Facebook page, it was unable to respond to the conversations within that platform, or share updates and information with this audience. Facebook is a particularly powerful medium in Australia, and Fonterra's absence on the site left it vulnerable to the spread of misinformation and attacks on their corporate brand.

It is now highly desirable that Fonterra build a network of key influencers so that there are pre-established lines of communication open in the event of a crisis. These influencers should include journalists, from both local and key international media outlets, agriculture trade publications and blogs, key customers, relevant brands, consumers with large networks (i.e. "mummy bloggers") and commentators.

A company with a corporate footprint the size of Fonterra, especially one operating within the food industry where public health and safety concerns are paramount, should have a world class digital strategy and capability across social media platforms to engage regularly with global audiences, influencers and news media. Social media has quickly become the go-to source of information for people within many developed countries, especially Asia.

Fonterra needs to have a sound understanding of how social media platforms function and their level of influence in each of the markets the company operates, which should in turn dictate the engagement strategy for these audiences.

Recommendations

- Fonterra should develop and implement a best practice digital and social media strategy that is aligned with the overarching group communications strategy. The strategy should include stand-alone elements for the domestic and international businesses to ensure that the media and stakeholder nuances are captured in each market.
- Fonterra should develop a comprehensive corporate digital strategy, including a social media crisis management plan. A more comprehensive dialogue with stakeholders more generally, including through social media across its markets, would underscore a greater openness and transparency in the way Fonterra establishes and maintains its relationships and build an engaged follower footprint as a distribution network in times of crisis.

Social Media Crisis Communications

- Fonterra should have a ghost website prepared in case of a crisis that is inputted with the company's key messages, clear contact information and space available for crisis-specific information (FAQs, media releases, etc). Multiple relevant foreign language versions should also be planned for.
- A Social Media Protocol should be distributed to all Fonterra staff immediately after a crisis is declared to ensure they do not post unauthorized messages on their personal social media platforms that could be misinterpreted or reported as "fact".
- A set of FAQ messages should be published on social media platforms, as posts, tweets or on discussion boards, in anticipation of public enquiries.
- All Fonterra social media platforms should be updated in tandem with the official website so information is consistent and up-to-date, and all should link back to the crisis micro-site.
- All communications materials (e.g. media releases, FAQ's, facts sheets) should be

broken down into shorter, platform specific 'posts' and approved by the legal team in advance so the communications team could be constantly updating the digital platforms.

- This could also include finding relevant external sources that could be used as reference materials or links to provide the public with "third party" information during the crisis (e.g. links to information on the specific issue "botulism").

- The Communications Team should also quickly establish a worksheet of keyword lists, hashtags and key influencers to inform their monitoring and content optimisation throughout the crisis. The list would include Fonterra brands, regulators, customers, competitors, industry.

- A flagging system (that determines level of urgency when responding online) should be implemented to categorise the online responses to the crisis in a way that is easily shared across the crisis management team. An ongoing flagging system also provides the team with a record of their interactions with users online and allows the team to build a database of influencers as the crisis develops.

- A specialist social media monitoring agency should be on standby to assist in the initiation of media monitoring, flag and arrange a response to enquiries, statements or accusations made online.

APPENDIX H

BEST PRACTICES IN CRISIS COMMUNICATIONS REGARDING FOOD CONTAMINATION AND FOODBORNE ILLNESS

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INTRODUCTION

This report represents a synthesis of the currently recognized best practices in crisis communications, especially related to food, food recalls, and foodborne illness outbreaks. In creating it, we have drawn from the most current available literature, providing relevant citations, and indicating where the recommended best practices are based on empirical research, the consensus of experts, or as the result of case studies of crisis communications successes or failures. Where possible, we also focus attention on crisis communications and strategies as applied to global food companies.

Communicating about food risks requires a good understanding of the essentials of the science of microbiology, toxicology, hazard analysis, and risk assessment. Yet, while this understanding is essential, it simply is not enough. Successful risk and crisis communications also depend on a deep understanding of human nature; how people perceive and respond to risks, their cultural beliefs and practices regarding food, how they think about "germs," chemicals, and other contaminants and, of course, how to talk with people about all of these things. So, in addition to understanding the basic science of foodborne risks, an effective risk communicator also needs to understand something about psychology, sociology, anthropology, epidemiology, economics, organizations, communications, public health, public relations, planning, media, and marketing (Hallman, 2008).

Clearly, it isn't possible to cover everything one needs to know about each of these topics in a concise review of best practices. There are a large number of books and scientific articles devoted to each of these subjects, and to the issues of risk, risk perception, risk management, and risk and crisis communications. Instead, this review draws on these disciplines and their key resources to identify the current best practices and some of the unique challenges inherent in communicating about food-related risks.

METHODOLOGY

In September, 2013, the authors conducted a thorough review of the academic literature, using multiple sources. To conduct targeted searches for the most relevant and up-to-date literature, we used databases maintained by Academic Search Premier, Science Direct, and Google Scholar. The terms we searched included combinations of the following: "food recall," "product recall," "recall," "crisis," "communication," "best practice," "case study," "international," and "multinational." In addition, we searched the academic literature using the names of some of the 100 largest food companies, including both those with the best reputations for crisis communication and those who have recently dealt with publicized food contamination problems.

In addition, we commissioned a graduate student to search the Chinese literature and to summarize important articles about the Chinese food system and crisis communications that are not available to English speaking audiences.

BEST PRACTICES

Based on our review of the literature, we have identified a number of best practices in food crisis communication. As many of the researchers whose work is cited in this report have noted, empirical research in the field of crisis communication is still in its very early stages (Coombs & Holladay, 2008; Freberg, 2013; Hallman & Cuite, 2010). In addition, because the majority of the empirical research and theoretical approaches to best practices were developed by American researchers in the context of American food contamination incidents, the best practices literature is somewhat US-focused. However, by specifically seeking information about the practices and experiences of international companies, and including the Chinese database searches, we have been able to expand these practices to fit into a more international framework.

RISK COMMUNICATION AND CRISIS COMMUNICATION

To begin, it makes sense to draw a distinction between risk communication and crisis communications. While drawing heavily on the risk communication practices and literature, *crisis communication* might best be thought of as a special case involving risk communication.

RISK COMMUNICATION

The term "risk communication" has different meanings to different users. However, an authoritative definition by The National Research Council (NRC) of the US National Academies of Science characterizes risk communication as "an interactive process of exchange of information and opinions among individuals, groups, and institutions. It often involves multiple messages about the nature of the risk or expressing concerns, opinions, or reactions to risk messages or to the legal and institutional arrangements for risk management" (NRC, 1989). Within the context of food risks, it involves working with important stakeholders to collect, discuss, and disseminate important information that is essential to effective efforts to assess, prevent, manage, control, and recover from incidents of microbial, chemical, and physical contamination of food products and outbreaks of foodborne illness.

The primary goal of risk communication is to help important stakeholders make informed decisions about risks that may affect them, or for which they have responsibility (NRC, 2005). However, consistent with the NRC (1989), Hallman (2008) notes that risk communication practices and principles are often applied to a variety of risk situations, with different objectives in mind, and with varying assumptions about the roles of the communicator and the targeted audience.

A common objective is to simply provide available information or education designed to put a new risk into context, or to help people appropriately prepare for, or to manage known, ongoing risks. For example, this may be the goal following the publication of a new scientific study, the discovery of a new or re-emerging pathogen, or a new vector. This may also be the goal when information becomes available about new practices, materials, or equipment that

can more effectively prevent, manage, or remediate contamination. The key is that the goal is to provide useful, comprehensible information so that individuals can choose what *they* believe is the right course of action to deal with a particular risk.

In contrast, some risk communication efforts are specifically designed to persuade people to adopt a particular point of view, or to act in particular ways that are beneficial to individuals or to overall public health. In this case, there is assumed to be a "correct" set of beliefs to which people should subscribe or that there is an optimal course of action that, if taken, would benefit the individual or society. Food safety training, basic hygiene, and other health promotion campaigns fall into this category.

In other circumstances, the objective of risk communication is to engage stakeholders in a process designed to surface and discuss information that will lead to better decisions about preventing, managing, or remediating risks. Lundgren and McMakin (2013) refer to this as "consensus communication. Typical examples include talking with managers or employees while conducting a HACCP analysis, or as part of the process to design safer work areas, procedures, or equipment. Other examples include talking with people to more clearly understand their concerns about a risk or their experiences with it. Indeed, because risk information is often controversial, members of the public, activists, government officials, scientists, suppliers, and corporate executives and other stakeholders may frequently disagree about the nature, magnitude, and severity of the risks in question. Therefore, risk communication may also include elements of conflict resolution and consensus-building, explicitly involving informed participation by and dialogue with stakeholders, and consideration of their concerns, with the goal of facilitating effective decision-making (US Public Health Service, 1995).

CRISIS COMMUNICATION

While "risk communication" and "crisis communication" are sometimes used interchangeably, "crisis communication" is sometimes more narrowly defined as involving "the exchange of risk-relevant and safety information during an emergency situation" (Glik, 2007).

As Tinker and Vaughan, (2010) note, "Crises are dynamic, unexpected events that involve a significant threat, ongoing uncertainty, and usually greater intensity than longer-term risk situations. Crises require immediate and effective actions to lessen harm". Crisis managers at the Harvard Business School (Leuke 2004, pg. xvi) are taught that, "A *crisis* is a change – either sudden or evolving – that results in an urgent problem that must be addressed immediately. For a business, a crisis is anything with the potential to cause sudden and serious damage to its employees, reputation, or bottom line." Expanding and updating this definition, Fearn-Banks (2011, pg. 2) suggests that "A *crisis* is a major occurrence with a potentially negative outcome affecting the organization, company, or industry, as well as its publics, products, services, or good name. A crisis interrupts normal business transactions and can sometimes threaten the existence of the organization."

Often, crises may also be characterized by the high degree of hazard represented by the situation and the high degree of emotional reaction in response (Sandman, 1989, 2003). In addition to the economic, financial, and management crises faced by companies in other sectors, food companies produce consumable products that, if compromised, may result in significant illness or death. Given the widespread distribution of food products and ingredients, the consequences of contamination incidents may also extend globally.

From the consumers' perspective, most of the common biological contaminants, and many of the chemical and physical adulterants of food products are invisible and therefore undetectable by individuals. Thus, consumer exposure to these hazards is involuntary, and is outside of their control unless they can be adequately warned, recognize the affected products, and be persuaded to take action prior to consuming them (Hallman & Cuite, 2010). As a result, the potential consequences of these crises require urgent communications to address them. Moreover, because of the nature of the hazards involved and their invisibility, and because the source of their contamination is often not immediately known, these types of crises are often associated with a great deal of uncertainty. These crises are also often marked by rapidly evolving events and the introduction of new information after the initial discovery of a critical

problem. These require dynamic efforts to assess the importance and impacts of the new events and the value of the new information as the crisis unfolds.

Some scholars also suggest that because of the context, urgency, and dynamic nature of crisis events, the goals for crisis communications are often different from those of more routine risk communication activities associated with ongoing risk situations (Sellnow, et al. 2009). In particular, in addition to the goal of protecting public health associated with traditional risk communication efforts, crisis communications often include specific strategies to protect, redeem, or enhance an organization's reputation that may be threatened as the result of a crisis (Coombs, 2007).

However, it should be clear that good risk and crisis communications should *not* be considered as a substitute for poor risk assessment, prevention or management, nor should it be construed as a type of public relations designed to placate the public after an incident involving illness or contamination. Instead, it should be understood as being integral to *every* step of the process required to effectively deal with food risks. Best practices for doing so is the subject of this report.

CRISIS MANAGEMENT AND CRISIS COMMUNICATION

PRE-CRISIS PLANNING

DEVELOP INSTITUTIONAL POLICIES THAT CONSIDER RISK AND CRISIS PLANNING

Organizations cannot simply pay lip-service to the idea that they care about crisis communication. Best practices indicate that there has to be an institutional culture that values the importance of crisis communication in the development of institutional policies (Seeger, 2006). Along similar lines, those who study food safety say that there has to be a culture of food safety at all levels of an organization to ensure adherence to best practices (Powell, Casey, & Chapman, 2011; Whitaker, 2010; Yiannis, 2009). Moreover, this culture cannot simply be created once a problem has been detected. Instead, it must be a part of the overall

institutional culture, including at the highest levels of the organization. Communications must be integrated into the overall institutional policies, and decisions should be made with an eye toward communications needs of all stakeholders (Seeger, 2006).

ORGANIZING FOR CRISIS MANAGEMENT

Most large organizations, including those in the food industry have developed internal capacity and infrastructure to anticipate, continually scan for, and quickly respond to emerging crises. Who should be on the crisis team varies by the size, type, and complexity of the organization. Typically, however, they include key members of the organization responsible for core business functions, including human resources, supply, operations, distribution, marketing, quality assurance/control, risk management, legal, consumer relations, etc. who have the knowledge, skills, experience, and authority to help the organization prepare for, respond to, and manage crises. Shoenberg (2005) also emphasizes that as part of putting together crisis management teams, organizations should go beyond just identifying people with technical skills. He argues that organizations also need to focus on developing leadership skills, and on identifying the most effective individuals to lead during a crisis, enlisting them in an organization's planning and ongoing crisis management efforts.

Leighton and Shelton (2008) suggest that to help determine the broad categories of things that can and cannot be communicated from a legal perspective during a crisis, attorneys should be part of the team involved in the planning stages of putting together a crisis plan. Best practices suggest identifying a minimum of two trained spokespeople who can represent the organization in case one is not available during a specific crisis.

In addition to creating a permanent core crisis management team, many large organizations, including governmental agencies such as the US Centers for Disease Control and Prevention, and large multinational food companies such as Unilever, Kraft (Mondelēz International, Inc.; McKee & Richardson, 2009), and Procter & Gamble (Dyer, Dalzell, & Olegario, 2004) have developed greater crisis response capacity by identifying key leaders and "subject matter experts" throughout their organizations. These are formally recognized as

having important roles and responsibilities in crisis management and response, with the expectation that they will be called upon to provide information and expertise to help anticipate, monitor, and respond to emerging crises that are relevant to their parts of the complex organization. In this way, experts from across the organization, along with some key stakeholders (see below), are formally brought into the crisis management process in ways that are flexible and modular.

Indeed, Weick and Sutcliffe, 2007 make the case that in organizing for crisis management, companies need to focus on resilience; the ability to cope with unexpected events. They point to Wildavsky (1988) who argues that there is an important distinction between dealing with the unexpected events by trying to anticipate them and "sinking resources into specific defenses against particular unexpected risks," and resilience, which entails "retaining resources in a form sufficiently flexible – storable, convertible, malleable – to cope with whatever unanticipated harms might emerge (pg. 220).

Weick and Sutcliffe note that resilient organizations invest in knowledge and develop control over resources that can be rapidly mobilized to develop a flexible response to the unexpected. They also propose that resilient organizations both anticipate and manage the unexpected in particular ways. The first is that these organizations have systems in place that are focused on tracking small problems as potential indicators of larger issues that may be wrong within the system. These problems might lead to more severe consequences, especially if several small lapses happen together. They argue that the "ability to make sense out of an emerging pattern is just as important as anticipation and planning" (pg. 69). Therefore, in addition to paying attention to small problems, the managers of these companies resist oversimplification, recognizing that seeing the same problem either regularly or intermittently does not make it "normal," but rather as an indication of a potential issue worthy of concern. They are also on guard against oversimplification of data that if more properly analyzed and understood, might reveal patterns of underlying problems or lead to a more sophisticated set of solutions.

Resilient organizations also have mechanisms that help them pay attention to what is happening at the level of front-line operations. They specifically encourage and empower managers and employees to share routine information with each other and to speak up when they see problems. Without such information, Weick and Sutcliffe argue, it is not possible to develop a big picture of normal operations or to identify symptoms of potential crises.

These organizations are also poised to flexibly respond to crisis situations, allowing them to "work-around" problems as they emerge. For food companies, this may include contingency plans designed to secure alternative key material supplies at short notice, to transfer or share production between manufacturing sites or, when necessary, to quickly identify and use substitute materials in product formulations and recipes.

In addition to developing an internal capacity for crisis management and crisis communication, many companies also rely on, or supplement their response teams with external resources and experts. While no statistics are readily available, the extent to which reliance on external experts appears to be largely a function of both company preparedness and prior experience with crises, and the severity and scope of the crisis when it emerges. For example, within the realm of food recalls, companies that are prepared but have little internal capacity may be able to effectively handle recalls that are of small scope and of little severity (no illness, no injury). On the other hand, companies with internal capacity may require external resources and experts during high profile, wide-spread, high injury recalls. Along the same lines, an unprepared company, with or without internal capacity, may require external resources for even the smallest, no injury recall.

INCLUDE STAKEHOLDERS IN THE PLANNING PROCESS

Best practices also call for including key external stakeholders in an organization's crisis management planning and response. For food companies, these may include producers, suppliers, distributers, and key customers of the organization, or others who would likely be impacted by a problem involving one of the company's products, or who might themselves be the source of a problem that would impact the company's products. As such, best practices also

entail including such stakeholders in the crisis management planning processes, and where appropriate, to have defined roles and responsibilities within an organization's crisis management team. Pre-agreements may also be established concerning reciprocal responsibilities for notifying partners when issues are identified with the potential to impact them. These agreements may also include requirements for stakeholders to share specific data necessary to identify, manage, or recover from a contamination issue.

Including stakeholders in the planning process maximizes the likelihood that their interests and concerns will be addressed when the time comes to communicate with them about any emerging crisis. For example, including employees in the planning has been shown to be an effective strategy, as they can serve as successful brand ambassadors when crises arise (Cagle, 2006).

The first thing to be considered is the question of which stakeholders need to be included in crisis planning and subsequent crisis communications. The answer to that will vary from organization to organization. In general, stakeholders include organization management, employees, board of directors, shareholders, other companies along the supply chain, relevant government agencies, news media, and the public who ultimately consumes the affected product. However, some stakeholders may be less obvious, and their relationship may only become clear when a food contamination or other crisis event has occurred. These can include public interest groups concerned with food, nutrition, allergies, or the environment; food safety advocates; food safety and crisis communications researchers; government elected officials at every level; industry-wide associations; trade groups; and even other similar companies that may normally be considered competitors. For international companies, this can be even more complex, as multiple governments, media and publics are likely to be stakeholders.

Including the stakeholders in planning can be an opportunity to establish a good relationship and a create brand loyalty, which has been shown to help organizations keep customers in the wake of product harm crises (Cleeren, Dekimpe & Nelsen, 2008).

CRISIS COMMUNICATIONS PLANS AND PROTOCOLS

In addition to creating a crisis management structure and a team of professionals that is able to quickly be called into action, many large organizations, both in the private and government sector have established crisis communications plans and protocols. A recent survey of business leaders of 826 large and small businesses located in the European Union, United States, Latin America, and the Asia Pacific region found that globally, 54% of the companies reported that they had established crisis communication plans (Burson-Marsteller, 2011).

However, there were substantial regional differences in the Burson-Marsteller survey. Asia Pacific companies were more likely to have a crisis communication plan (64%) than companies in the US (55%), or in Europe (51%). Latin American companies were the least likely to have plans (29 percent). The study also found that within the previous 5 years, 47% of the companies surveyed had increased the internal resources devoted to responding to a crisis. Those who believed that they were most prepared for an emerging crisis reported that they followed a number of best practices: 1) they reviewed their plans at least twice a year; 2) They followed a process for identifying potential crisis scenarios; 3) they had a specific action plan or protocol for crisis management; 4) they considered financial planning in case of a crisis; and 5) they engaged in continuous issue monitoring.

However, even among those with a crisis plans, 47% believe that their current plans contain significant gaps. Significantly nearly half of the respondents (49%) believe that the rise in digital communications has increased companies' vulnerability to crisis, yet only 38% of companies have a digital crisis communications plan to effectively respond to new media.

CREATE A PLAN

One of the first steps of good crisis communication is creating a crisis communication plan (Fink, 2013). When putting a plan in place, it is critical to recognize that a crisis communication plan is an integrated element of a more global crisis response strategy. While these may both be included in the same document, it is important to maintain clarity that they

are discrete plans, with the global crisis response plan being the larger, organization-wide response to the management of the crisis itself (e.g., determining if a product is causing harm or detecting a pathogen that may be causing illnesses). Crisis *communications* plans are most likely to be successful when they are focused strictly on the *communication* factors (Seeger, 2006).

At the most fundamental level, the elements of a crisis communication plan involve creating guidelines about what the right message is, to whom the message should be told, who should do the telling, and when is the right time to tell it (Leighton & Shelton, 2008). However, many organizations go beyond simple plans and create sophisticated crisis communications *protocols* that are designed to clarify the roles and responsibilities of key members of the crisis management team as well as other employees within the organization in response to a crisis. Because the events or issues that may trigger a crisis differ, an important feature of these protocols is that they are designed to be both adaptive and scalable depending on the seriousness and significance of the issue.

Because best practices call for organizations to include key external stakeholders in their crisis management teams, these protocols also typically spell out the roles and responsibilities of these stakeholders in joint communications, when they may be called upon, and what may trigger their involvement. Joint crisis communications protocols typically include plans for cooperative message development and delivery, including how decisions will be made about key messages. They also discuss joint determinations about appropriate media strategies and tactics, and ways to listen to and respond to those affected, including toll-free hotlines, web, email, and social media responses. They may also detail partner pre-agreements concerning the circumstances under which a specific organization will take the lead in response to a crisis, which organization will be responsible for drafting and ultimately controlling message content, and which organization will be responsible for managing (and paying for) the logistical requirements of the crisis communications. The protocols may also include descriptions of agreed-upon approvals processes including specific timelines in which approvals are required,

and who will be responsible for the creation, maintenance, and distribution of records of joint decisions, and briefing plans (e.g., Public Health Agency of Canada, 2010).

There are multiple crisis communication templates available, many of which have a unique focus (e.g., food crises, terrorism, etc.). For example, within the U.S., there is a Federal Emergency Management Agency template (2010), as well as the Crisis and Emergency Risk Communication (CERC) Template from the Centers for Disease Control (2012). At an international level, there are templates that can be applied more broadly, beyond the U.S., and these templates generally include some elements of accepted best practices in the U.S (e.g., European Food Safety Authority, 2012). Significantly, after searching the Internet in Chinese, and consulting with Chinese food safety experts, no Chinese crisis communication templates appear to be publically available to industry.

Ideally, the plan will have been so well crafted that executing it will be as straight forward as possible. Given that not all crises are foreseeable, there will need to be some flexibility built in to the plan, but the plan should be followed as faithfully as possible. Crisis communication plans, like crisis response plans, should be practiced, reviewed, and updated regularly. However, because many crisis communications plans focus only on the technical aspects of communicating, Marra (1998) argues that simply having a crisis communication plan is a poor predictor of the quality of the resulting communications.

MESSAGE MAPPING

Several US Federal agencies, including the Centers for Disease Control and Prevention, the Department of Health and Human Services and the Environmental Protection Agency have adopted message mapping as part of their pre-event crisis communication planning. Based largely on strategies long used by advertising agencies and political communications consultants to help develop clear, coherent, and consistent messages, message mapping has been adapted by Covello (2006) for use in preparing for crisis communications.

Message maps function as a structure for creating hierarchically organized responses to questions or concerns before a crisis. It is specifically designed to: 1) anticipate public and stakeholder concerns and questions, 2) provide a framework for organizing key information, 3) promote discussion about key messages both inside and outside of the organization 4) help constrain and simplify messages so they are clear and concise, and 5) promote message consistency.

To create message maps, groups of stakeholders are assembled to construct sets of questions that are likely to be asked by different audiences in the event of a specific crisis. To address each anticipated question, hierarchically organized messages are constructed. Each is supported by key information that may be targeted to a particular audience. (See http://www.orau.gov/cdcynergy/erc/content/activeinformation/resources/Covello_message_mapping.pdf).

In Covello's formulation, the messages are highly constrained. He argues that under high stress situations, people's ability to remember more than a few messages may be compromised. In addition, he argues that both print and television coverage of crisis events may only include very short quotations from communicators. As a result, he recommends that in responding to a crisis, communicators strive to deliver only three key messages drawn from among the many messages that may be developed during the pre-event message mapping exercise. He suggests that for each of these key messages, three connected supporting messages also be developed and delivered. These messages may include supporting factual information, visual information, citations of information from credible third parties, or sources of additional information.

However, Covello proposes that to be most effective, messages should be written at a 6th grade reading level, and that no single message should exceed nine words. Moreover, he suggests that the goal for the communicator is to deliver three key messages, with a maximum of 27 words, in nine seconds (see: http://www.epa.gov/nhsrc/toolsandapps.html#ws_mesmap). Some good examples of pre-

event message maps are those developed in preparation for an outbreak of pandemic influenza (U.S. Department of Health & Human Services, 2006).

There are several advantages of message mapping. Implementation of the message mapping process creates a structure that encourages organizations and their key stakeholders to anticipate problems and the kinds of questions that will likely need to be addressed in the event of a specific crisis. The constraints imposed by Covello (2006) also create a specific focus on creating messages that are simple, clear, and concise. Creating such messages can take a considerable amount of time to think through and to test, and are often best constructed outside of the substantial pressures present during a crisis.

However, the message mapping process places an extreme focus on the wording of the message. While this is very important, there is much more to risk communication than simply getting the words right. In addition, while creating simple, clear, concise messages is critically important, there does not appear to be any peer-reviewed empirical evidence of the validity of the very specific criteria set by Covello of being able to deliver three messages in nine seconds in no more than 27 words.

Pre-packaged message maps may also give organizations a sense of overconfidence that they have adequately prepared for crisis communications. However, each crisis situation unfolds differently and has its own contexts, nuances, and affected audiences. Because of this, not every question, issue, or stakeholder concern can be adequately anticipated or addressed before a crisis unfolds. Message maps also don't take into consideration who is delivering the message, or the context or the setting in which it is delivered.

So, while pre-event message mapping exercises can be a useful tool in preparing for a crisis, the process used to generate the messages may be even more important than the ultimate message map. In part, this is because it forces a focus on identifying important potential stakeholders in the event of a crisis and on anticipating their likely concerns and need for information. The process also typically draws in teams of subject matter experts, policy experts, communications experts and others within an organization. The exercises used to

generate the messages, can reveal diverse views and positions within an organization in response to the same question. Reaching consensus on these issues in advance of a crisis can be extremely valuable. Issues that are raised during the mapping process that cannot be adequately addressed by the organization may also provide valuable information about potential gaps in the organization's overall crisis management plan.

IMMEDIATE RESPONSE

BE THE FIRST COMMUNICATOR

Organizations that can communicate quickly, ideally as the first source to get a message out, can set the tone of the story, and therefore have a greater chance of contributing to the narrative that reaches the public. Lehane, Fabiani and Guttentag (2012) emphasize a "first in, first out" approach, whereby the time an organization spends in the spotlight is minimized as much as possible. In addition, the first source of the story often becomes the public's preferred source (Centers for Disease Control, 2012).

There are other critical issues to be considered when thinking about when to communicate. Does the crisis involve an immediate threat to public health, the environment, or to the food system? If the threat is indeed imminent, and the potential exists for significant harm, it will require a rapid response. Foodborne illness outbreaks and potential contamination incidents often fall into this category, depending on the pathogens or substances involved and their likely impacts.

In contrast, attempts to address more enduring food safety problems may permit more time with which to plan and to engage in a sustained communications campaign. For example, efforts to promote safe food handling, storage, preparation, and consumption practices, or to improve the necessary infrastructure essential to ensuring food safety may fall into this category.

This distinction is important because the timelines, communications strategies and methods, and the resources required are different. In reality, the urgency with which one must communicate typically falls along a continuum. Indeed, food safety risk issues are often initially addressed as the result of public health emergencies which require immediate responses. Later, however, risk communication efforts regarding those same risks may become part of overall strategies designed to reduce food safety risks. This can include systematic efforts to anticipate and prepare for possible emergency situations that may occur in the future.

HONESTY, TRANSPARENCY, AND OPENNESS

Honesty and candor are cited almost universally as a key feature of best practices in crisis communication (e.g., Centers for Disease Control, 2012; Sandman & Lanard, 2004; Seeger, 2006). In keeping with this, it is important to respect the rights of the public to be informed, and not treating them as an adversary from whom information must be protected (Tierney 2003).

There are a number of seemingly interchangeable terms that can describe the flow of information from an organization to its stakeholders during a crisis—honesty, candor, openness, and transparency. Some researchers suggest that these variables can be thought of as being on a continuum (Seeger, 2006), where honesty is at one end of the spectrum, as the bare minimum requirement of *not lying*.

However, risk communication practitioners suggest that there are important distinctions. For example, the European Food Safety Authority (EFSA) (2012) counsels that principles guiding risk and crisis communications include openness, transparency, independence, and responsiveness/timeliness. It considers the principle of openness to include making risk assessments and other information available in a timely way such that information on which decisions are made can be examined by key stakeholders. Open dialogue with these stakeholders and other interested parties is also critical to building trust in the risk assessment and management process.

EFSA suggests that the related principle of transparency is equally important in building trust and confidence in the organization and the risk assessment and management process. This includes both transparent decision-making and a transparent approach to explaining how an organization works, its governance, and how it makes decisions. It argues that for government agencies, communicating about risks will always be perceived as more trustworthy if those undertaking the risk assessments, making risk management decisions, and communicating them, are independent from political decision makers, industry, NGOs or other vested interests.

For industry, the corollary is that it is often important that appropriate government organizations be partners in assessing, managing and communicating about crisis situations (Fink, 2013). However, to be most effective, those organizations must maintain their credibility by being given open access to the information they need to make independent decisions and to safeguard the integrity of its scientific work.

Finally, consistent with the approach that early communications are often crucial, EFSA argues that communicating in a timely and accurate manner, even when all the facts are not known will contribute to ensuring the source of information is seen as credible and trustworthy in the long-run. See: Be the First Communicator (above).

IDENTIFY AND UNDERSTAND YOUR AUDIENCE

Food companies utilize sophisticated tools to identify and communicate with multiple audiences when they are marketing products. Communications and channels are carefully matched to demographic, cultural, and psychographic factors, and messages are delivered in multiple formats in an attempt to reach as many audiences as possible. It is equally important to do this type of market segmentation when the goal of the communication changes from introducing and selling a product to alerting the public about a problem (Hallman & Cuite, 2013). Perhaps the key factor to consider during a crisis is language. For example, Americans speak more than 170 languages, and almost one in five Americans speaks a language other than English at home. For an American organization, simply releasing a crisis communication in

English, using only English-based media will not be sufficient for any large scale food crisis. Issues of communicating in different dialects, with native populations, and other sensitive topics will vary from country to country but must be considered by all organizations (Veil & Rodgers, 2010.

The number of communications channels available to food companies and grocery retailers has expanded dramatically in recent years. Personalized or targeted messages, such as phone calls to customers whose purchases are tracked through loyalty cards, social media campaigns and mobile device alerts have great promise as a means to have greater audience reach. Identifying the appropriate channels and identifying communicators proficient in languages other than English are all part of the crisis communication plan, and must be done in advance of any crisis.

It is important to note that while using market segmentation to reach your audience is desirable, there is evidence that delivering different message *content* to different groups can be viewed negatively and perhaps as giving preferential treatment to one group over another. So while the use of different channels, languages, and dialects are often warranted, it is important to keep the message the same (Booz Allen Hamilton, 2010).

COMMUNICATE WITH COMPASSION, CONCERN, AND EMPATHY

Another factor that is widely agreed upon is the importance of demonstrating empathy and compassion during a crisis (Covello, 2003; Sandman, 2010). This is considered one of the key elements to maintaining consumer trust and loyalty through a crisis, it is and some go as far as to prescribe that it should be expressed within the first 30 seconds of a communication (Centers for Disease Control, 2012).

As Sandman (2010) points out, demonstrating empathy involves listening and helping those with whom you are communicating feel heard. In addition, trying to put yourself in the shoes of those with whom you are communicating is a good way to craft empathic and compassionate messages (Centers for Disease Control, 2012). Sandman (2007) also discusses

the inherent tension between being considerate of others' feelings while not intruding on their feelings. He points out that because empathy is so context driven and interpersonal, there can be no "cookbook" for how to express empathy. Empathy and compassion have more to do with being present, listening and caring than checking off a box of things to say.

COLLABORATE AND COORDINATE WITH CREDIBLE SOURCES

Collaborating and coordinating with credible sources has been identified as a key best practice by crisis communication experts (Seeger, 2007; Littlefield & Sellnow NCFPD list). The authors' most recent research project has found that when all else is equal, the public is more likely to better understand food contamination events, believe information to be accurate, and to follow instructions when communications are from (in order): Government sources, then media sources, and finally when communications come from the organization itself (Hallman & Cuite, 2013). Therefore, whatever plan is in place should include government and media communication about the problem (to the extent that an organization has control over that), and the desired actions the consumer should take. A similar research study found that crisis messages generated by the organization itself are preferred by the public to those generated by message recipients' peer social media users (Freberg, 2012). Because in any crisis situation, an organization cannot control all communicators, communications must come directly from the organization itself. However, it is key to recognize that communications from the organization will be viewed differently (and potentially less favorably) than those coming from the government or media, but will likely generate a stronger response than those created by the public social media users. So, the same message from different sources may have different effects.

In addition to the public responding differently to information from different sources, there are benefits to collaborating with other credible sources and having a communications strategy that includes coordinating and cross-checking with all potential communicators. There has been heated debate on whether all actors should "speak with one voice" when responding to a crisis or risk controversy (Sandman, 2006). However, often in practice, what this means is

agreeing upon, and delivering a consistent, coherent message regardless of who is communicating.

Some hierarchical organizations, including many government agencies try to achieve this by maintaining tight, centralized control over both the messages and who is permitted to communicate, often restricting the later to authorized spokespersons. However, Chess and Clarke (2007) and Sandman (2006) sound cautionary notes about the difficulties and constraints of speaking with one voice and attempts at maintaining centralized communication control. This is especially true when multiple affected stakeholders are involved who may have differing goals and motivations for speaking. These may include producers, suppliers, or customers who want to maintain their own reputations and avoid liability. These stakeholders may also include governmental or regulatory officials (sometimes from multiple countries) who have a responsibility to protect public health. As such, maintaining message discipline can be extraordinarily difficult.

MEET THE NEEDS OF THE MEDIA AND REMAIN ACCESSIBLE

As part of pre-event planning, identifying and training staff to interact with the media is a key to successful communication. If crisis communication is valued at an institutional level, planned and budgeted for, there should be pre-identified staff to be available to media. This staff should have specific training, and should be prepared for the most common types of questions.

Covello (2003) has outlined the 77 most likely questions that journalists will ask any crisis communicator, all of which fall into the who, what, where, when, how categories. He states that the three essential questions journalists are trying to answer are about what happened, why (or what caused it) to happen, and what the event means to the public. In addition, there is a handbook published by the World Health Organization (Hyer & Covello, 2005) that outlines how to deal with the media during a crisis event. This report stresses the importance of planning in successfully using the media as a means of communicating with the public during an organizational crisis.

It is also important to recognize the importance of interacting with media sources on social media platforms, which are discussed below.

ACCEPT UNCERTAINTY AND AMBIGUITY

Accepting and acknowledging uncertainty is a widely cited tenet of risk communication (e.g., Seeger, 2008; National Center for Food Protection and Defense, 2009). One leading risk communication expert goes as far as to say that communicators should "explain and proclaim" uncertainty rather than simply accept and acknowledge it (Sandman & Lanard, 2011). If an organization doesn't know something, it is imperative that all stakeholders recognize that as an unknown.

The importance of communicating uncertainty has received a lot of attention in the academic risk communication literature recently (for example, an entire edition of Risk Analysis was devoted to it in November, 2011). Why is uncertainty such an important issue? Because in most crisis situations, communicators rarely have the luxury of working with complete or certain data. Indeed, where urgent communications are required to prevent or reduce the risks of significant harm, uncertainty and incomplete data are often the norm. However, in such cases, decisions must be taken to protect the public using the best information that is available. Waiting for better or more complete information before taking initial steps to address what *is* known may mean that additional people will be exposed, made ill, or die. Failing to do so also risks loss of trust in the risk communicator in the long-term, making it more difficult to effectively communicate about future food safety risk issues. Moreover, waiting for better or more complete data before communicating can result in even greater threats to public health as others attempt to impose their own views of the nature of the situation and what should be done about it. However, while important decisions must often be made and communications released using incomplete information, as better and more complete information becomes available, crisis communicators also have a responsibility to release and discuss it, its implications, and any revised course of action that the organization is taking.

PROVIDE INFORMATION ABOUT WHAT THE ORGANIZATION IS DOING TO RESOLVE THE CRISIS

When an organization has information that nobody else has, such as information about microbiological testing of product, or production practices that may have led to problem with a product, communicating that information can be very powerful (Lehane, Fabiani, & Guttentag, 2012). One of the things that only an organization itself can know with certainty is what actions are currently being taken to resolve a crisis situation. The advice to disclose this information to the public has gained increased attention in recent years, and is consistent with advice to accept uncertainty described in the preceding section. While an organization may be uncertain about many aspects of a crisis, and it is important that they acknowledge that uncertainty, there is evidence that releasing information about what they are doing to reduce uncertainty—and resolve the crisis situation--can bolster the public's confidence (Cuite, 2012).

PROVIDE CLEAR AND ACTIONABLE INSTRUCTIONS FOR THE PUBLIC TO FOLLOW

There is consensus that a goal of crisis communications is to promote action by providing clear and actionable instructions (Seeger, 2006; Centers for Disease Control, 2012). In addition to protecting themselves, some theorize that this is beneficial for the public because it gives people a sense of agency, and can promote a sense of calmness and order (Centers for Disease Control, 2012).

A variable that is often included in this area of providing instructional information is for communicators to try to increase self-efficacy, which involves communicating that the desired action is something that the message recipient is able to do. Risk and crisis communication can address self-efficacy by emphasizing everyday language and providing all the key action steps that an individual can do to successfully avoid a potential harm.

One example of providing information that was not actionable for many people comes from the authors' own research during the egg recall of 2010. Survey results indicated that 50% of the public did not know what a shell egg is. However, the organization's recall notice,

government recall notices, and subsequent press coverage all instructed the public to avoid shell eggs, which was not actionable for those who did not know what type of egg was being referred to. It is perhaps even more disconcerting that they used Julian dates to identify the affected packages, as it is very probable that the public doesn't know what a Julian date is.

In conclusion, speaking in simple language that the public can understand, and letting the public know what they need to do to avoid the hazard in a way that it is clear what you are asking them to do is likely to maximize the desired response by the public.

WHEN WARRANTED, PROVIDE VICTIM-CENTERED COMMUNICATIONS

Not every food recall or other situation that requires crisis communication results in actual harm. But when harm has occurred, it is important to communicate in a way that is victim-centered. Apologies are often thought of as the gold standard of victim-centered crisis communication messages when harm has occurred, and research supports that this can be an effective strategy (e.g., Benoit & Drew, 1997).

Fink (2013, pg. 263) suggests that "if you are going to issue an apology, it is better to do it early, while it still looks like it was your idea and, therefore, is sincere. If the public thinks an apology is called for and you are slow to the gate, it will look as if you were shamed into it, and your credibility will be diminished by your delay. That's almost as bad as saying nothing." He proposes that crafting an effective apology requires careful language, strategic thinking, good communications skills, and "reservoirs of good-will". He argues that a good apology has several key components. It must not be self-serving; it must be directed to those who have been harmed by your actions; it must convey your acceptance of responsibility of the problem and your sense of regret, it must be accompanied by acceptable reparations; and where possible, credible evidence that the problem which necessitated the apology will not be repeated.

Cultural factors may also play an important role in how apologies should be offered and whether they are accepted. The "meta-messages" sent by the "who," "how," and "in what time frame" these apologies are made are as important as the actual content of the apologies.

However, sometimes organizations may choose to not make apologies in an effort to avoid accepting responsibility for a problem and to avoid the potential for subsequent expensive litigation (Coombs & Holladay, 2008; Dezenhall & Weber, 2011). Moreover, Fink (2013), cites a case in which false claims were made by consumers that syringes were being found in cans of Pepsi. He suggests that companies should not be too quick to apologize, especially if the circumstances suggest that the contamination problem being reported is impossible or implausible, and the company can clearly demonstrate this.

Recent research tells a complex story about the benefits of apologizing from the perspective of consumer perceptions. Although Benoit and Drew (1997) did find that apologizing and offering concessions were the most effective communications strategy to maintain a positive public image, subsequent studies using similar experimental methods found that apologies are not the only way for an organization to respond to those to whom may have been harmed. More recent research has found that other victim-centered messages, such as expressing sympathy and/or offering compensation have a similar effect on the public's perceptions of the organization involved, at least in cases involving low to moderate levels of crisis and resulting anger (Coombs, 2008).

One recent case of failing to provide appropriate victim-centered communication was the Nestle cookie dough recall, where the organization was instead was perceived as blaming the victim for inappropriate use of the product (Harris, 2009; Marler, 2009). While it seems clear that not providing an appropriate apology or other victim-centered message is problematic, simply providing an apology may also not be enough. A case study of the media coverage of the Mengniu milk crisis found that the apologies offered in that situation were viewed as not sufficient or a successful response to the situation (Luo, 2010). Dezenhall and Weber (2011) describe a number of different scenarios where apologies have been less than successful (including the Coca Cola contamination in Europe in 1999). They cite numerous factors, including the pre-crisis sentiment toward an organization and the wording of the apology, which can affect how well an apology or other victim-centered approach may work.

ONGOING RESPONSE

SOCIAL MEDIA

Social media is a unique communications format. Platforms such as Twitter, Facebook, Instagram, blogs are just some of the available tools for communicating directly with the public, without being filtered through a media source. In addition, social media can serve as a channel for receiving direct feedback from consumers and other stakeholders—for better or for worse (Capozzi & Rucci, 2013). In most cases, this feedback will go directly to the organization as well as to others on social media. Social media cannot serve as a replacement for traditional media, but rather social and traditional media are best viewed as complementary and inter-related formats, and close attention must be paid to each (Jordan-Meier, 2011).

According to a recent review of the literature, the issues that must be addressed in general crisis communication have direct correlates in the world of social media crisis communication (Veil, Buehner & Palenchar, 2011). For example, a social media plan must be incorporated into an organization's crisis plan. Similar to overall crisis communication planning, it is important to note that an organization must lay the social media groundwork prior to a crisis by developing an ongoing relationship with your audience. In fact, if an organization does not develop relationships and connections with consumers on social media before a crisis happens, it may not have a large enough network with whom to communicate when a crisis occurs. A steady stream of interactions on social media may build trust, which can help in times of crisis (Veil, Buehner, & Palenchar, 2011). In addition, traditional media follow and report on events unfolding in the social media sphere, so relationships should be built with sources from traditional media on social media channels as well (Jordan-Meier, 2011).

Social media can provide a sense of self-efficacy to consumers, and make them more likely to feel heard and valued by an organization. As with all communication channels, some groups are more likely to be represented than others, and within social media platforms there are different user populations (Veil, Buehner, & Palenchar, 2011).

Because social media is now so pervasive, organizations should not overlook its importance (Jordan-Meier, 2011). Releasing a poorly thought-out statement on social media can become a crisis in and of itself (Capozzi & Rucci, 2013). Unfortunately, however, as of 2009, only 13% of organizations in a nation-wide survey reported that they had a social media plan built into their crisis communication plan (Russell Herder & Ethos Business Law, 2009).

One recent example of social media crisis messaging gone awry is Kraft's handling of mold found in Capri Sun drink pouches (Violi, 2010). After not responding to a complaint for 10 days, what Kraft eventually posted on Facebook as their official response was not in line with crisis communications best practices. Kraft stated that the mold was not a safety issue, while acknowledging that it was "unpleasant." Expressions of empathy and concern were missing, and this was noted by Facebook commenters, who described not only unhappiness with the food product but also with the poor crisis response.

CULTURALLY APPROPRIATE COMMUNICATION

There is a dearth of empirical research on multi-cultural crisis communication (Farkheimer & Hyde, 2006). While the majority of the research has tended to look at a national audience as a whole, there has been some work to understand how crisis communication should be tailored to different audiences (e.g., Littlefield & Cowden, 2006; Littlefield, Cowen & Hueston, 2007).

The unique roles that food and food preparation practices play in culture and society play an important part in how people perceive their risks and benefits. Differences in beliefs about the acceptability of certain food risks in relation to their benefits are also important to understand. Based purely on communicating the results of a scientific risk assessment, one might expect people to reject foods and practices that carry objectively higher risks than benefits. Yet, this is often not the case.

In some circumstances this decision is driven by simple economic realities. In the absence of the availability of affordable alternatives, many may have little choice but to

consume foods that are of lower nutritional quality and which may have an increased risk of contamination by pathogens, chemicals, or physical adulterants. For such populations, communicating only about the risks associated with these products, without providing the resources necessary to enable different food choices is unlikely to advance public health.

Differences in beliefs about the acceptability of the risks and benefits of certain foods and food practices have other bases as well. Some may be deeply rooted in specific food cultures and culinary traditions and practices that carry important religious, symbolic, and cultural meanings and values. It should be remembered that fasting, feasting, and the ritual preparation and consumption of certain foods, especially during holidays and specific taboos or restrictions regarding the consumption or touching of other foods all play dominant roles in many religious and cultural practices and identities.

Across cultures, giving food to others or sharing food with them is also an essential (and often expected) representation of kindness, generosity, and of hospitality, and with creating and maintaining relationships among people. As a result, there is shame and dishonor associated with providing unclean or unsafe foods to others, and especially with making others ill. Because of this, crisis communicators must be careful to present food safety information so that is not improperly perceived as an unwarranted accusation of offensive behavior that would likely result in the immediate denial of responsibility, creating a barrier to behavior change. However, under the right circumstances, the fact that most people would like to avoid the stigma of being seen as providing unclean or unsafe food to others may be used as a motivation to change behaviors.

Crisis communicators also need to be aware that some foods have special symbolic importance. For example, in many cultures, the perceived adulteration of milk, honey, fruit, vegetables or other products that that are culturally associated with health, purity, and wholesomeness may be seen as especially objectionable. The risks connected with the contamination of these foods may also be perceived as much greater because of their symbolic value. Similarly, the contamination of foods associated with feeding infants or children may be

seen as particularly risky and especially unacceptable both because of the real vulnerability of those potentially exposed, and because of the symbolic violation.

CRISIS COMMUNICATIONS IN CHINA

When considering international crisis communication issues, perhaps no country requires more in-depth consideration than China. China was thrust on the international food and product safety stage as a result large scale recalls as the result of melamine in pet food (2006 in the US and 2007 in Canada) closely followed by other product recalls including but not limited to toothpaste, toys, and clothing. The situation reached a point that the U.S. Consumer Product Safety Commission began to publish its "China Product Hazard Monthly Summary Bulletin" in May of 2008, highlighting all the Chinese recalls in a given month (http://www.cpsc.gov/en/Business--Manufacturing/International/Chinese/Monthly-Recall-Summaries/China-Product-Hazard-Monthly-Summary-Bulletin-June-2012/).

As a result of these scandals, a crisis communication plan unlike any other was begun—an attempt to repair a country-wide, rather than organizational, image problem. Analyses of the Chinese government's response to the scandals indicate that at first, China used a strategy of denial, not only for the pet food scandal but also for subsequent problems like the toys, clothing, toothpaste and other food products (Peijuan, Ting, & Pang, 2009). The analysis found that the Chinese government subsequently engaged in blaming the victim, for example with faulty tires imported to the United States, as well "bolstering," or claiming that although they may not meet other countries' standards, the products were not unsafe. It was not until later, after mounting evidence in multiple industries of products exported to multiple countries, that China eventually switched its tactics and began engaging in remedial action. Given this, and the many individual organizations whose strategies closely parallel that of Chinese government (Ye & Pang, 2011;), the Chinese public has less trust in their government and industries than the public of other countries. The lack of trust and unique history that the Chinese public have endured must be considered when approaching crisis communication in China.

When approaching crisis communication in China, one need be aware not only of the general lack of trust among Chinese consumers, but also the influence of media. Internet-based media, especially social media (such as Weibo) play such a crucial role in current Chinese public discourse about risks that particular attention to this is warranted (Zhang, 2012). Thus, when considering crisis communication in modern China, there are several facts that need to be taken into consideration. A key issue is that Internet-based media gets involved in such problems earlier than traditional media and has a tremendous influence on public opinion. Recent food contamination cases have shown that, like elsewhere around the world, "Grass-roots" opinion leaders can greatly influence the direction of public opinions in the new media environment. However, somewhat unique to China is the immeasurable impact of authority media (The "central" media, a series of media source including TV channels, newspapers, and websites, which is regulated by Publicity Department of the CPC Central Committee) (Lu, 2009, Gong 2012, Zhang, 2012).

However, empirical evidence does suggest that with a well-constructed, consumer-centered and responsible risk communication strategy, accompanied by good relationships with, and appropriate use of various media sources, and sincere efforts to restore consumer trust, crisis communication and trust reconstruction can be quite successful (Lu, 2009, Gong 2012). In contrast, failure to effectively carry out any of these critical components can lead to a failure of the overall crisis communication strategy, resulting in a potential disaster for the companies involved (Lu, 2009, He, 2012, Zhang, 2012, Anonymous, 2011).

EVALUATION

Unfortunately, it cannot be assumed that organizations will learn from their past crisis communication experiences (Miller & Littlefield (2010)). Therefore, it is important to conduct an internal or external evaluation after each crisis, ideally for both the crisis response plan *and* the crisis communication plan. The evaluation can help to address questions such as, "Was the crisis response plan adequate?" and "Did our organization adhere to the crisis communication

plan?" The plan should be revised according to lessons learned from each crisis, and any newly developed plans should be rehearsed.

Regardless of whether a crisis event occurs during the course of a set period of time (often one year) the crisis response and crisis communication plans should be evaluated. In this case, questions such as "Have there been any intra-organizational changes that necessitate changing elements of this plan?" and the corollary question for external changes must be asked, and the plans altered as needed.

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APPENDIX I:

STAKEHOLDERS' RATINGS OF FONTERRA'S PERFORMANCE DURING THE WPC80 EVENT

The Inquiry was assisted by a series of confidential, non-attributable interviews of people within Fonterra and a group of external stakeholders.

External stakeholders were drawn from:

- customers;
- investors and analysts;
- farmers/shareholders;
- government officials/regulators;
- media – New Zealand, specialist, foreign;
- industry associations.

Twenty-four of the external interviewees were, at the conclusion, asked to rate Fonterra's performance across six criteria. The scale was 1 to 5, with 5 being "excellent".

This method of obtaining perceptions of performance has the advantages of encouraging respondents to concentrate their impressions into a limited and quantified range. This in turn permits a level of comparison between individual and groups of respondents.

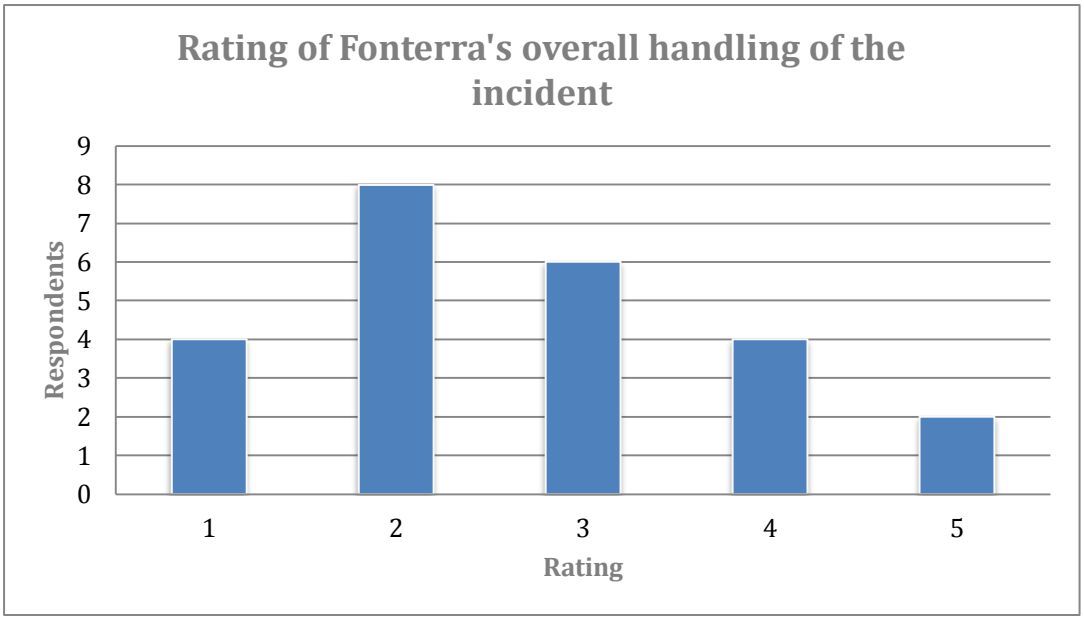
While this methodology is useful, it does not purport to be scientific and its limits are evident.

Further, in a number of interviews the respondents found an opportunity to outline (in confidence) historical frustrations with Fonterra. That context doubtless contributed to some unfavourable ratings in relation to the specific questions.

Unsurprisingly, the results cover a wide spread, with perceptions shaped by the nature of the relationship with Fonterra and the effect of the WPC80 events on the interviewee.

Farmers/shareholders and investors tended to rate Fonterra higher while government officials, regulators, customers and NZ and foreign media tended to rate Fonterra lower, sometimes significantly lower - with several in these groups initially suggesting negative or zero ratings on some of the questions, notably on Fonterra's overall management of the WPC80 event.

1. HOW WOULD YOU RATE FONTERRA'S OVERALL HANDLING OF THE INCIDENT?



The highest number of respondents, a third of the sample, rated Fonterra as 2 out of 5.

Most conceded things improved after the first few days, but that before that happened "*the damage had been done*".

Two of these respondents offered ratings of zero, and one offered "minus 1.5". Those respondents were in positions where, putting aside the fact the crisis had arisen in the first place, they felt aggrieved by Fonterra's inability to provide complete and accurate information about the product affected:

- *"The fact that this happened at all was unbelievable. Everyone was taken by surprise and they couldn't reassure consumers."*
- *"It was a terrible situation, the pressure was intense, but in the beginning they looked disorganised, chaotic and unprofessional."*
- *"They just didn't manage the media well in the first couple of days and the media punished them."*
- *"They have got a huge amount of work to do now to re-establish their credibility."*

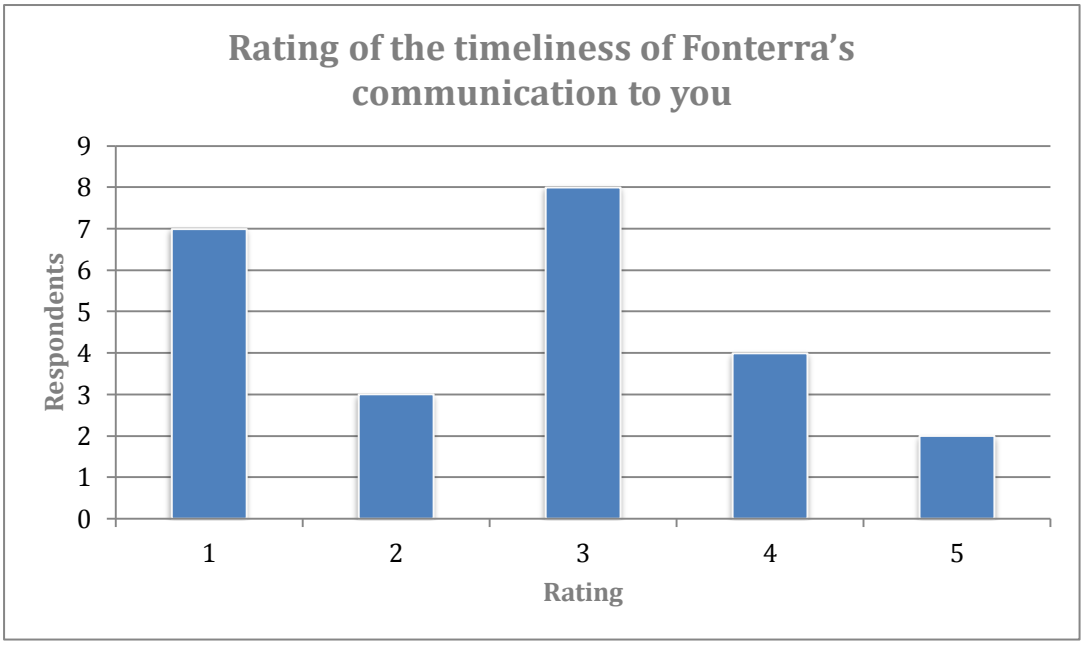
In contrast, institutional investors and market analysts were sanguine in their ratings of Fonterra:

- "*We have a really good relationship with the company. We were reassured there was nothing systemic going on – we had done a lot of work to understand the company before listing. And no-one got sick – in fact, it was all a false alarm."*
- *"We didn't find out 'til Monday and by then things were being sorted out."*

Farmer/shareholders felt well-informed:

- *"It was a worry, but they kept us updated pretty well."*
- *"Sometimes, we had far too much information – a lot of it rhetoric."*
- *"They did the right thing going public and the media whipped it into a frenzy."*
- *"I couldn't have asked for more – it was really well done and all our questions were answered"*

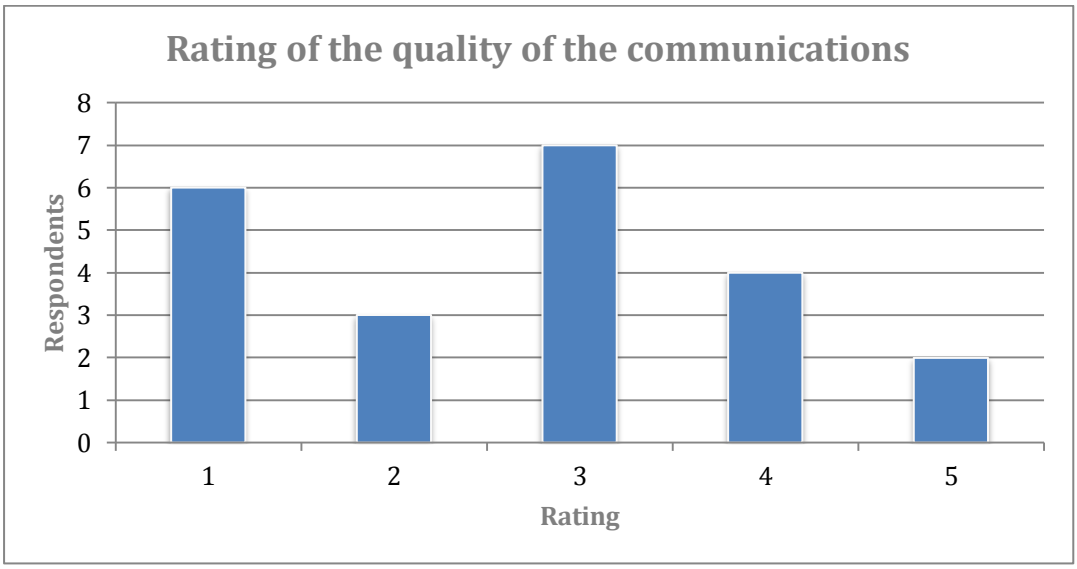
2. HOW WOULD YOU RATE THE TIMELINESS OF FONTERRA'S COMMUNICATION TO YOU?



One of the biggest concerns was the perception that Fonterra did not release information to stakeholders soon enough. Many respondents had a limited knowledge (if any) of the sequence of events which preceded the precautionary recall, and this plainly influenced their comments and assessments. In any event, some stakeholders had a very strong view they should have been informed earlier. Some found out via news media rather than from Fonterra itself, which they believed was inappropriate given their particular positions. Others felt they were brought in at the right time.

- *"Our contact in sales was great. We were contacted before the balloon went up and were able to do our work and get ready. We had a few hairy moments but were able to establish we were all clear."*
- *"A lot goes back to that announcement at midnight. Were they trying to hide it, or was it panic? Anyway, we should have had a heads up – people started ringing us with queries and no-one from Fonterra had called."*
- *"It seemed disrespectful to us not to tell us directly. It would have only taken a phone call."*
- *"They should have been better prepared earlier and let the appropriate people know."*

3. HOW WOULD YOU RATE THE QUALITY OF THE COMMUNICATIONS?



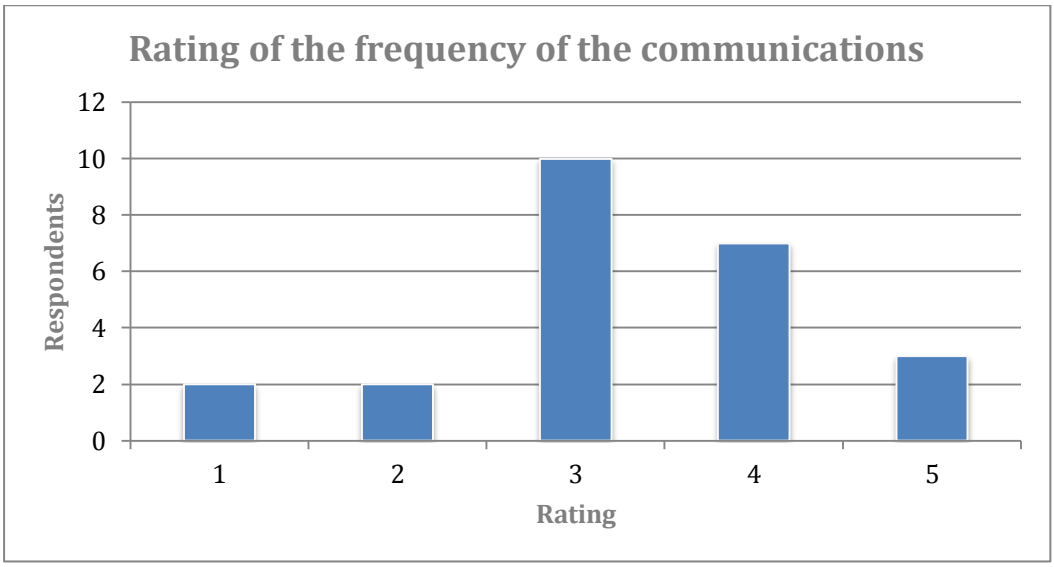
Most respondents reacted adversely to Fonterra's inability to provide complete and accurate data on the potentially affected product on Day 1, or in the first 72 hours. However, it was also universally agreed that the quality of the communications improved thereafter.

Media respondents were critical of the minimizing language used in some of the early communications. Others saw the initial messages as unclear.

There was also mention of the lack of emphasis on the "false alarm" news of late August, when MPI advised that further extensive testing has established that the SRCs in the relevant WPC80 bathers were not C. botulinum

- *"It was just untenable that they couldn't tell us exactly where the product was, and which brands. What about the poor consumers?"*
- *"They just couldn't cut through in the early days because they couldn't answer the questions and reassure mums with babies."*
- *"They didn't apologise until days later".*
-
- *"Full of euphemisms and double-speak instead of straight talking."*
- *"They told us everything they possibly knew. It was good."*
-
- *"Their language should be more accessible."*
- *"They eventually got better at reminding people it was a precautionary recall."*
- *"I'm still not sure everyone knows it was a false alarm."*

4. HOW WOULD YOU RATE THE FREQUENCY OF THE COMMUNICATIONS?

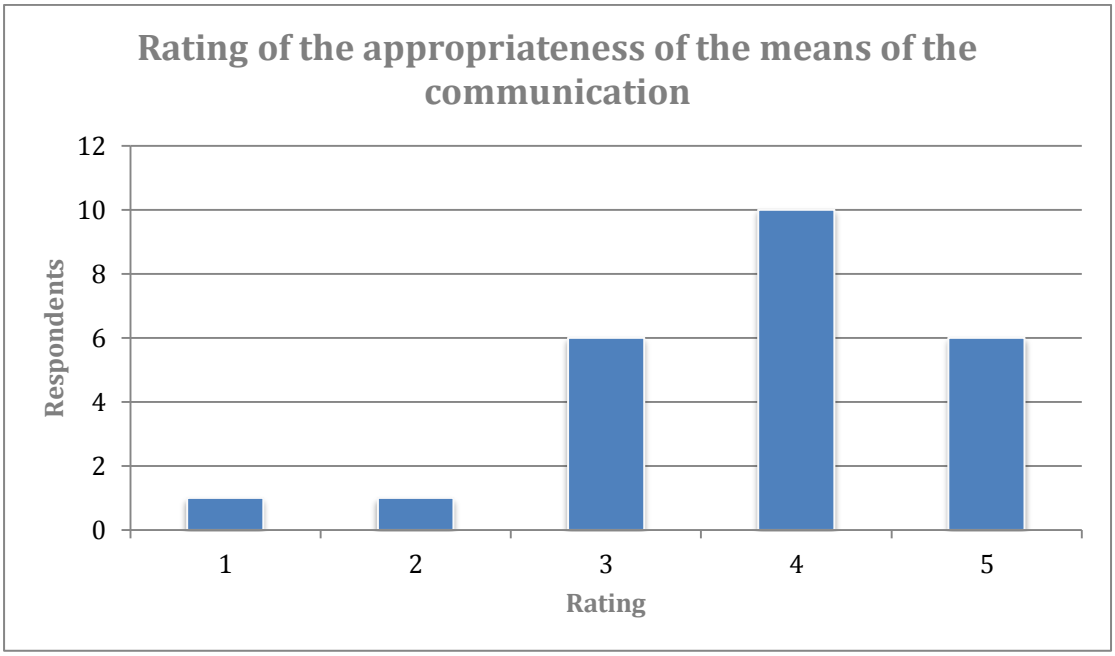


Most respondents rated Fonterra reasonably well on keeping people informed. Some marked the company down for the initial delay.

Once the first few days had passed, communications with key stakeholders were seen to be made at appropriate times:

- *"They got into the swing of it after those first few days and tried pretty hard."*
- *"We were definitely kept informed. The investor relations aspect is very good."*
- *"I was too busy to read all of it, to be honest."*
- *"[Our sales account manager] was fantastic."*
- *"They clearly threw tons of people at it and it got better."*

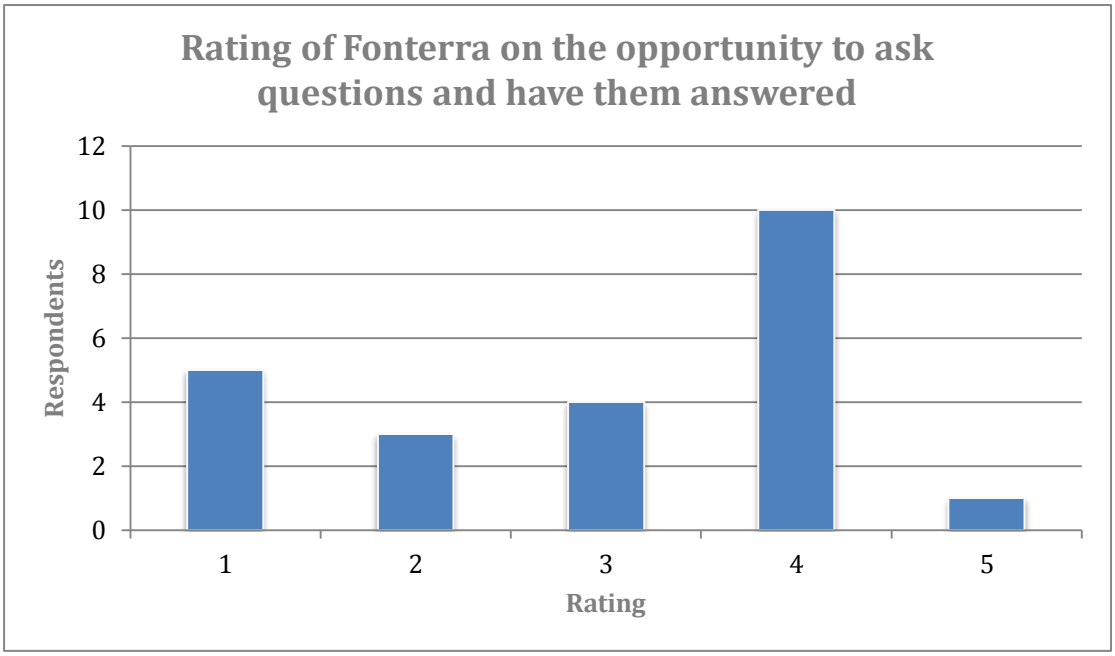
5. HOW WOULD YOU RATE THE APPROPRIATENESS OF THE MEANS OF THE COMMUNICATIONS – personal call, group briefing, newsletter, video, email etc?



For the most part, Fonterra chose the methods of communications well:.

- *"Yes – the Sky channel is good and the Farmer Updates are too."*
- *"A phone call would have been nice. But at least I got the media releases."*
- *"They eventually got the stuff up on the website – but it took a while."*
- *"Why don't they just talk to me instead of responding to my questions by email all the time?"*
- *"We see the directors – they are out and about."*
- *"We never see the directors."*

6. HOW WOULD YOU RATE FONTERRA ON THE OPPORTUNITY YOU HAD TO ASK QUESTIONS AND HAVE THEM ANSWERED?



The majority of respondents rated Fonterra positively on the opportunity it gave stakeholders to ask questions and have them answered:

- *"Very good. We knew they didn't have all the answers at first, but they got there."*
- *"I'm still waiting for some of the answers to questions I asked. They still haven't got back to me."*
- *"It depends when. At the beginning, hopeless, towards the end, better."*
- *"Plenty of opportunities. All I needed to do was pick up the phone."*

APPENDIX J

FONTERRA'S WPC80 OPERATIONAL REVIEW (AUGUST 2013) – INQUIRY OBSERVATIONS

The Inquiry has at all times been aware of the Operational Review commissioned by the Chief Executive and led by Fonterra's Group Director Strategy which was undertaken during the period of the Inquiry's own investigation, and released on 4 September 2013. The Operational Review and the Inquiry conducted their investigations quite separately, and the Inquiry had an additional specific focus on governance and culture. However, there is some significant overlap and consistency between the Operational Review's and the Inquiry's recommendations. Accordingly, it is appropriate that this Inquiry add its observations on the Operational Review's work. Those are set out in the table below. It is not surprising that there is obvious consistency between the various recommendations of both workstreams.

For ease of reference, the table below sets out the Operational Review's recommendations and brief observations by the Inquiry on each of those recommendations.

Operational review recommendation	*Inquiry observations*
Food Safety recommendations	
Recommendation 1: Creation of Group Director Food Safety and Quality role reporting directly to the CEO. • A focused role with specific delegated authority related to quality, particularly around changes to process and non-standard processes • Role would be responsible for the development, collection and reporting of new Fonterra Group level food safety and quality policy and metrics • A review of existing metrics (e.g. cost of quality, and other manufacturing KPIs) should be undertaken to ensure appropriate balance and incentives • Performance against these Fonterra wide policies and targets would be regularly reported to FMT and the Board	*The Inquiry endorses Recommendations 1 and 2 of the Operational Review. The creation of a Group Director Food Safety and Quality and a Food Integrity Council should enable Fonterra to put into effective practice any necessary process changes, and will increase the emphasis on food safety and quality. To that end, the creation of both a Group Director Food Safety and Quality and a Food Integrity Council is consistent with several of the Inquiry's recommendations.* *However, it would also be consistent with those recommendations for the new Group Director to have a dual reporting line – to the proposed new Risk Committee as well as the CEO, and a relationship with or membership of the proposed IMT.* *Further, and together with Recommendation 18 (Quality hotline), Recommendations 1 and 2 should minimise any risk that FQS responsibilities (and personnel) within business units may be compromised by manufacturing/commercial drivers.*
Recommendation 2: Creation of a Food Integrity Council chaired by the Group Director Food Safety & Quality. The Council would represent the amalgamation of a number of existing or proposed governance bodies (see below), with an initial strong focus on food assurance. • Food Safety & Quality Council • Global sustainability leadership group • On Farm Innovation Council	*See above, on Recommendation 1.*

Operational review recommendation	*Inquiry observations*
• Fonterra Reputation Council • Social Responsibility Council Terms of reference for the Council need to be developed, with consideration given to the following actions. • Review of the Group risk framework for areas of improvement in managing food safety risks • Definition of what needs to be notified, escalated and authorised by the Group Director of Food Safety and Quality and / or Food Integrity Council • A review of all Group-wide business processes and decision-making ensuring food safety and quality is adequately and appropriately considered • Establishment of a working group that proactively looks at food safety risks and ongoing management of these risks • Requirement of business units to confirm full disclosure / food safety compliance on a periodic basis • Other actions that shift organisational focus from mere compliance to treating food safety and quality as a source of competitive advantage	
Recommendation 3: Reflect food safety in all new employment contracts with voluntary inclusion in current contracts for levels one to three in the organisation. **Recommendation 4:** Heightened focus on the customer applied to quality complaints and Exporter Non-Conformances, with respect to escalation, root cause analysis, response and continuous improvement opportunities. **Recommendation 5:** Amend Performance Agreements across the organisation. • All our people, but our senior leaders in particular, need to understand the role they play in setting a strong example on food safety and quality • A simple way to reflect these expectations is to amend the staff annual Performance Agreements to include food safety and quality as a mandatory objective (in a similar way to Health and Safety, currently) • As a minimum first step, this change should be rolled out to all level three roles and further, as relevant, in larger operational business units • This is a visible and tangible change, relatively easy to	*The Inquiry endorses Recommendations 3 to 6 of the Operational Review, which are consistent with the Inquiry's own recommendations emphasising the need to increase awareness and improve behaviours relating to food safety and quality. Fonterra has earned justified praise for recent major improvements in its focus and performance on health and safety in employment. The Inquiry endorses efforts within Fonterra to elevate food safety and quality to the level of health and safety through training, incentives, processes and leadership.*

Operational review recommendation	*Inquiry observations*
implement, that signals a broader shift in expectations of our leaders and emphasises collective accountability for food safety • To be effective, this would need to be supported by visible consequences for non-compliance	
Recommendation 6: Develop a comprehensive suite of people initiatives to lift focus on food safety and quality. Further work is needed to determine the scope of this program but key elements likely to be considered are outlined below. • Review of behaviours expected of our leaders, specifically when it comes to food safety and quality. Build on the strong role models we have in the business to provide examples of "where we do it right" • Refresh of our employment brand, sourcing, on-boarding, training, development, performance and rewards processes to ensure food safety and quality is embedded in expectations throughout the careers of our employees • Fostering alignment across quality related teams to share learnings (e.g. Internal Audit, Risk and Group Quality auditors)	
Manufacturing and Testing recommendations	
Recommendation 7: Reset of Hautapu site. • Hautapu was closed on the 27th of August for a 12 hour reset • The reset included the decommissioning of suspect pipework, further testing and sanitation of the plant for restart – an MPI observer was present throughout	*The Inquiry has not made site-specific recommendations in respect of Hautapu but readily endorses the actions taken at Hautapu subsequent to the WPC80 crisis. In addition, the Inquiry notes the prompt efforts made by Hautapu staff to introduce long-term change in processes (for example, by introduction of a flexi-hose register in an effort to keep track of cleaning of flexi-hoses).*
Recommendation 8: Establish interim SRC testing program. • SRC testing on all whey products at feeder plants for nutritional applications, in advance of a wider review of testing and standards • Customer-driven, tighter SRC limits already in place • This testing program will require regular review	*The Inquiry considers that the lack of alignment between customer requirements and ingredients testing was an area of weakness contributing to the WPC80 event. Consistently with its own recommendation, the Inquiry endorses Fonterra's prompt efforts to establish an appropriate alignment in relation to SRC testing but would see this as only one step in a full and ongoing process to generally align its ingredient testing standards with Fonterra's customers' specifications.*
Recommendation 9: Complete focused audit of all sensitive plants. • Quality and compliance audit of Hautapu, Waitoa, Canpac and Kauri, Darnum complete, with plans for	*The Inquiry understands that these audits were undertaken urgently to provide clear assurance about processing operations in advance of the commencement of the 2013/2014 dairy season. It considers that such audits were a prudent and very worthwhile exercise. Further, the Inquiry*

Operational review recommendation	*Inquiry observations*
Dennington as the next priority • High-level findings from the audits suggest our processes are generally robust, but we rely heavily on some outsourced resources for pest control and other key product safety activities such as approval of CIP chemicals	*endorses the findings that Fonterra processes are robust across the board from a food safety perspective – see further, Appendix U.*
Recommendation 10: Identify non-standard temporary lines and plant equipment across NZ. • Any without a valid HAACP plan will be stopped • Others subject to a further risk assessment	*Recommendations 10 and 11 accord with a number of the Inquiry's own recommendations – see further, Appendix U.*
Recommendation 11: Address authorisations and compliance for non-standard processing (including rework) and testing. • Transparent rework sign-off protocols must be developed and communicated, with strict protocols on products that require rework due to microbiological and/or foreign matter contamination / exceptions. Will include sign-off on final use (and segregation) for any final products where rework has been added • Standard testing regime (with reference to final product usage and country standards etc) should be reviewed and adjusted as required, along with associated approval processes for non-standard testing • Change control procedures should be reviewed and overhauled where issues are identified. This would include defining change clearly and outlining implications (change management process/tools) explicitly • Full review of delegated authorities and escalation processes with respect to the items above	
Recommendation 12: Quality audits including all offshore businesses, third party manufacturing and Joint Ventures. • Quality review already launched to assess compliance across APMEA – similar plans should be extended to other regions • Audits should be independent (i.e. Group-led not business unit) and results captured at a global level so as to identify systemic issues and opportunities	*Recommendation 12 does not overlap with any specific recommendations by the Inquiry, but is consistent with the Inquiry's general emphasis on Fonterra ensuring excellence in every aspect of food safety and quality. It is also an effective answer to a query raised with the Inquiry relating to the NZMP quality audit regime operating separately from the regime applicable to other parts of the organisation.*
Recommendation 13: Full review of product standards, including alignment of ingredient specifications/testing with finished product specifications and testing and rework practices – with clear policies on when product is placed on hold and authorisations around release, including	*Agreed. See observations, above, in relation to Recommendation 8.*

Operational review recommendation	*Inquiry observations*
appropriate engagement with relevant customer representatives. • Review of raw materials testing standards and requirements for infant formula, GUMP or other TPM product • Review of current standards and other design options for sensitive plants/feeder plants to mitigate food safety risks (e.g. appropriateness of Bactofuges) • Full review of in-process specifications including alignment between ingredients and final product processing conditions. Clear exception reporting of non-standard or unusual processing conditions or in-process results that are outside operating norms (not just limits) • Alignment, simplification and, as required, refresh of quality standards across business units to meet our legal obligations in New Zealand (e.g. Animal Products Act) and internationally • In parallel, review of existing plans to roll-out international food standards (FSSC22000) across our sites and, where appropriate, consider accelerating	
Recommendation 14: Explore options to more proactively align with customers and regulators on standards. • Act to promote enhanced industry and government dialogue on ways to more effectively identify risks, improve current standards or systems and identify any other possible solutions to common challenges • Further work needs to be done to assess feasibility, appetite and objectives of other participants	
Traceability recommendations	
Recommendation 15: Define, document and communicate traceability protocols for Australia and FRDC. • Understand and close gaps in capability across Fonterra – identify key people across the business from a traceability perspective and ensure the lessons of recent events are internalised	*The Inquiry endorses all of the traceability recommendations made by the Operational Review. It is crucial that Fonterra be able to conduct prompt and definitive tracebacks in the event a product recall is needed. In substance, the Inquiry's only addition to the Operational Review's recommendations on traceability is an explicit proposal for regular training (including scenario testing) in tracing processes (which is likely implicit in Recommendation 17).*
Recommendation 16: Immediate review of QPM, Catalyst FBNZ and customer complaints system implementation plans to ensure adequate change and risk management and appropriate consideration of scope adjustments to enhance traceability.	

Operational review recommendation	*Inquiry observations*
Recommendation 17: Wider review and overhaul of Fonterra-wide product traceability capability, including for customer controlled products: • Definition of bracketing protocols and associated rework procedures • Traceability and recall protocols (including cautionary holds) should be written into customer contracts • The scope of Project Unity should be reviewed to understand whether it appropriately prioritises and resolves current systems gaps	
Transparency recommendations	
Recommendation 18: Institute a Quality hot-line to encourage early escalation. • Administered by Deloitte, independent of management, tasked with protecting the anonymity of callers • Clear path for passing through issues raised on the hotline to the Group Director of Food Safety and Quality • An important final safeguard, allowing any employee to raise concerns about food safety or quality, without fear of reprisal • Hot-line has already been set-up but not launched – collateral and communication plan being developed with urgency	*The Inquiry endorses the creation of the Quality hot-line as a practical and positive step. It is consistent with the need for Fonterra to elevate food quality and safety understandings to the same levels as health and safety (see observations, above, on Recommendations 3 – 5).*
Recommendation 19: Ensure we have a live, fit-for-purpose and well-rehearsed crisis management capability. • Review and improve the Escalation Business Process for functional groups, across business groups, and between Business and Group • Group crisis management plan should be reviewed in light of recent events, re-communicated and made more accessible • Establish a program of crisis and critical event rehearsals, including full-blown group crises and smaller events that do not escalate beyond a business unit • Test (among other things) that our product traceability can meet timeframes as defined in group policy – if possible include customers and regulators in the testing • Establish a network of external experts ready to advise in a crisis on key food safety risks (e.g. chemical, microbiological, biological), complementing internal expertise	*This recommendation reflects one of the fundamental lessons that should be taken from the WPC80 events and is consistent with several of the Inquiry's own recommendations. The Inquiry's recommendations extend to the establishment of a permanent (but not full-time) multi-disciplinary Incident Management team capable of managing emerging issues and potential crises, which is consistent with ensuring that Fonterra has appropriate crisis management capability.*

Operational review recommendation	*Inquiry observations*
Recommendation 20: Review and overhaul communication protocols with respect to third parties (customers, industry and government) in a crisis.	*The Inquiry endorses this recommendation, which reflects the Inquiry's own detailed recommendations. Collaboration with the government, regulatory agencies and other third parties would assist Fonterra in addressing any future crises.* *The Inquiry's emphasis on improved relationships with a number of Fonterra's stakeholders, and its recommendations to establish a strong, specialist communications team, and the development of a communications style and approach consistent with Fonterra's values, effectively incorporate (but are likely seeking more fundamental changes than) the Operational Review's Recommendation 20.*

APPENDIX K

GLOSSARY OF TERMS

Term	Definition
AgResearch	Crown Research Institute focusing on agricultural research and development
AHL	Animal Health Laboratory (operated by the Ministry of Primary Industries)
APC	Aerobic Plate Count. Measure of the level of micro-organisms in a product.
APMEA	Asia/Pacific/Middle East and Africa (Fonterra division)
AQSIQ	General Administration of Quality Supervision, Inspection and Quarantine (China)
AsureQuality	Regulatory Agency owned by the New Zealand government providing auditing, testing, inspection and certification services in the dairy sector (among others)
ASX	Australian Stock Exchange
B2B	Business-to-business
B2C	Business-to-consumer
BAM	Bacteriological Analytical Manual
BCM	Business Continuity Management
BMS	Business Management System
BoNT	Neurotoxin capable of causing botulism
Botulism	Illness resulting in a flaccid paralysis of vital organs.
BU	Business Unit
Canpac	Fonterra packing site located in Hamilton
CAPA	Corrective Action/Preventive Action plan
CCP	Critical Control Point
CDC	Centre for Disease Control (located in Atlanta, Georgia, USA)
CET	Critical Event Team
Cfu/g	Colony-forming units per gram (a unit of measure of the number of bacteria in a product)
CIP	Clean-in-Place

Term	Definition
CIQ	Customs, Immigration and Quarantine (China)
Clostridium	Large and diverse group of bacteria with more than 120 species.
Clostridium botulinum	Strain of clostridium that is a recognised food-borne pathogen, widespread in the environment and can be found in dust, soil, marine sediments, water, vegetables, fruits and leaves. Capable of causing botulism.
Clostridium perfringens	Strain of clostridium commonly associated with food spoilage. Does not produce botulinum neurotoxins.
Clostridium sporogenes	Strain of clostridium that does not produce botulinum neurotoxins.
CMP	Crisis Management Plan
CMT	Crisis Management Team
Codex	The Codex Alimentarius Commission, which drafted the "*Code of hygiene practice for powdered infant formulae for infants and young children"* (CAC/RCP 66-2008).
Cofco	Major supplier of products and services in the agricultural products and food industry in China
Cypher	The code used to describe a specific batch of product produced by Fonterra, for tracing purposes.
DAFF	Department of Agriculture, Fisheries and Forestry (Australia)
DCANZ	Dairy Companies Association of New Zealand
DCD	Dicyandiamide – agricultural chemical
DFSV	Dairy Food Safety Victoria (Australia)
ERP	Enterprise Resource Planning application system
FA	Fonterra Australia
FAO	Food and Agriculture Organisation of the United Nations
FCS	Fonterra Compliance System
FFA	Fonterra Food Assurance (specialist team within the FRDC)
FGCMT	Fonterra Group Crisis Management Team
FIC	Food Integrity Council
FMT	Fonterra Management Team
FO	Follow-on Formula

Term	Definition
FQS	Food Quality and Safety
FRDC	Fonterra Research and Development Centre (located in Palmerston North)
FSQC	Food Safety and Quality Council
GCI	Greater China and India (Fonterra division)
GDT	Global Dairy Trade
GOSC	Group Optimisation and Supply Chain
GUMP	Growing Up Milk Powder
HACCP	Hazard Analysis and Critical Control Points plan
IMT	Incident Management Team. A proposed permanent multi-disciplinary group of professionals in Fonterra specifically charged with identifying, advising on and managing emerging issues, potential crises and actual crises.
IUMS	International Union of Microbiological Societies
JDE	JD Edwards – Fonterra's provider of ERP systems until April 2013
LATAM	Latin America and Caribbean (Fonterra division)
MAF	Ministry of Agriculture and Fisheries
MALDI-TOF	Test capable of analysing protein profiles of clostridia samples to assist with identification of species.
MBA	Mouse Bioassay
MFAT	Ministry of Foreign Affairs and Trade
MPI	Ministry of Primary Industries
NO_2	Nitrogen dioxide
NVSL	National Veterinary Services Laboratories
NZFSA	New Zealand Food Safety Authority
NZMP	New Zealand Milk Products (Fonterra Business Unit)
NZX	New Zealand Stock Exchange
PD	Product Disposition Request
PCR	Polymerase Chain Reaction
RA	Regulatory Agency

Term	Definition
RMP	Risk Management Plan
SAP	German-manufactured ERP system (Fonterra's current ERP system)
SRC	Sulphite-Reducing Clostridia
UHT	Ultra-heat treatment processing (for sterilisation of food products)
WHO	World Health Organisation
WPC80	Whey Protein Concentrate (80% concentration), an ingredient used in various food products, including some nutritional products for babies and infants.