

Review of MHA: Process Monitoring

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Executive summary

The current project, *Review of Meat Hygiene Assessment (Process Monitoring)* (AMPC 2024-1004), represents the final element in modernising how the export meat industry monitors its processes, products and microbiological profile. It culminates a series of reviews which the Australian Meat Processor Corporation (AMPC) commissioned the South Australian Research and Development Institute (SARDI) to conduct:

- ◆ *Process Control Monitoring – Is there a better way?* (AMPC 2017-1068) - a critical analysis of the *E. coli* and *Salmonella* Monitoring (ESAM), Product Hygiene Index (PHI) and Meat Hygiene Assessment (MHA) programs.
- ◆ *Process monitoring for the Australian Meat Industry – A Comparative Industry Trial* (AMPC 2018-1070).
- ◆ *Visual monitoring of carcase and carton meats – a system for the 21st century* (AMPC 2019-1066).
- ◆ *Meat Hygiene Assessment 3 – an Industry Trial* (AMPC 2021-1091).

In reviewing how the industry undertakes monitoring of its unit operations, SARDI surveyed 18 establishments (9 beef, 5 sheep, 3 pork and 1 game meat). The results indicated that since the promulgating of MHA 2: Process Monitoring in 2002, monitoring in general has been required to respond to a number of significant domestic and global developments including:

- ◆ Increased market access requirements, both domestically and internationally
- ◆ An increase in the intensity and frequency of audits by regulatory and commercial bodies
- ◆ Significant market diversification
- ◆ Introduction of interventions
- ◆ Introduction of a Refrigeration Index (RI)
- ◆ Adoption of a risk-based approach to manage food safety and trade risks
- ◆ Recent chronic labour shortages leading to employment of under-skilled operators

To accommodate the above, establishments have extended the original template forms to include many more operations identified as requiring monitoring e.g. one establishment, has increased the slaughter/dressing template 'baseline' of 27 operations to 73 operations.

SARDI also reviewed process monitoring requirements in the United States, Canada, New Zealand, and the European Union, finding:

1. The Canadian Food Inspection Agency requires a system similar to the USA Food Safety and Inspection Service and is outcomes-based, neither specifically requiring establishments to monitor operator compliance with work instructions.
2. New Zealand, by contrast, has no formal process monitoring system, instead focusing verification on hygienic processing of carcasses by checking Zero Tolerances (ZTs) at post-mortem. The regulator has set National Performance Criteria for the prevalence of ZTs and, if these are not met, a complicated 'window' testing regime is triggered. No carcase is allowed to leave the slaughter floor with any visible enteric contamination.
3. The EU seems to align with the US/Canada and NZ in having no formalised process monitoring system but instead, leaving it to companies to verify that work instructions are followed.

The research team presented the survey findings, together with discussion and options papers to the Reference Panel comprising representatives from industry, AMPC, the Australian Meat Industry Council (AMIC), the

Department of Agriculture, Fisheries and Forestry (DAFF), and to a number of establishments which had expressed an interest in participating in the project.

Together, over an iterative process in 2023-24, the predominant wish was that there be substantial change to MHA 2: Process Monitoring based on a system which:

1. Is company-specific according to the company's identified food safety and trade risks and has monitoring points decided by the company.
2. Has a frequency of monitoring which reflects the risk associated with a specific processing operation.
3. Has no scoring system and hence no Conformity Index.
4. Records deviations from work instructions and implements immediate corrective action.
5. Summarises data generated by each week's process monitoring, product monitoring, microbiological monitoring and ZT detections for review and to inform preventative corrective action.

SARDI has developed these elements into "MHA 3: Process Monitoring **and Analysis**", the latter added to accommodate element 5 (above) where the expectation by DAFF is that the establishment will react to findings of deviations from work instruction by reviewing and eliminating them.

It is proposed that a 3-month trial be undertaken of the proposed MHA 3: Process Monitoring and Analysis system by establishments which are representative of the industry, and that establishments which have participated in development of the system be given an opportunity to participate in the trial.

1.0 Introduction

Following outbreaks of STEC illness in USA, in 1996, the USA Food Safety and Inspection Service (FSIS) implemented a series of important regulations surrounding the hygiene of meat destined for grinding. These included the Pathogen Reduction Final Rule (known as “the MegaReg”) and the declaration of *Escherichia coli* O157 as an adulterant for which there is zero tolerance.

Australia’s export meat regulator (then the Australian Quarantine and Inspection Service, AQIS) responded to the MegaReg with the publication in 1996 of *Meat Hygiene Assessment: Objective Methods for the Monitoring of Product and Process*. The system was developed primarily by Dr Evan Singleton (AQIS) and Australia-based FSIS staff and was designed specifically to align with procedures carried out by Australia’s (then) major customer; a 2nd edition was released in 2002.

Over recent years, AMPC has commissioned SARDI to undertake a series of comprehensive reviews of monitoring in the Australian meat industry: *Process Control Monitoring – Is there a better way?* (AMPC 2017-1068) – a critical analysis of the *E. coli* and *Salmonella* Monitoring (ESAM), Product Hygiene Index (PHI) and Meat Hygiene Assessment (MHA) programs; *Process monitoring for the Australian Meat Industry – A Comparative Industry Trial* (AMPC 2018-1070); *Visual monitoring of carcass and carton meats – a system for the 21st century* (AMPC 2019-1066) and *Meat Hygiene Assessment 3 – an Industry Trial* (AMPC 2021-1091).

In consultation with industry and the Department of Agriculture, Fisheries and Forestry (DAFF), SARDI facilitated the adoption of an improved system of product monitoring, MHA 3: Product Monitoring, which was implemented by the industry in July 2023.

The present review of MHA 2: Process Monitoring is intended to progress development and adoption of MHA 3: Process Monitoring and Analysis in much the same way that was followed for developing and implementing MHA 3: Product Monitoring (see Methodology).

The stated aim of Process Monitoring as set out in MHA 2 (2002) is that: “.. operations are conducted in accordance with good manufacturing practice resulting in minimal macro and micro-contamination of product” and, while this aim is as laudable now as it was in 2002, much has changed, most notably in the range and intensity of audits by regulators and customers:

- ◆ An increase in the intensity and frequency of audits by regulatory and commercial bodies
- ◆ Significant market diversification, especially to China
- ◆ Introduction of interventions
- ◆ Increased market access requirements, both domestically and internationally
- ◆ Introduction of a Refrigeration Index (RI)
- ◆ Adoption of a risk-based approach to manage food safety and trade risks
- ◆ Recent chronic labour shortages leading to employment of under-skilled operators

As well as risks associated with food safety, companies are now required to deal with numerous specific programs including: DAFF, EU, USA, Chile, Halal, Warm boning, Coles HGP-free, Never ever, Cadmium, MSA, Organic, Grain fed, Victoria, GAP, NE, Y, MK/non-MK, DMM, China, Indonesia, Swiss SHQB, Saudi Arabia, Farm Assurance, Angus, BSE Exclusion, Woolworths, Aldi, British Retail Consortium, AusMeat.

The current MHA 2: Process Monitoring system is prescriptive and the intention of the present investigation is to simplify process monitoring and to integrate it with aspects of MHA 3: Product Monitoring and with the establishment’s microbiological monitoring.

2.0 Project Objectives

The objective of this project was to review, in consultation with industry and regulatory stakeholders MHA 2: Process Monitoring and develop a new system to sit alongside, and integrate with, MHA 3: Product Monitoring.

3.0 Methodology

The methodology comprised the following key components:

- ◆ Reconstitute the Reference Panel: industry, DAFF, AMIC and AMPC members (teleconference and face-to-face meetings).
- ◆ Undertake a brief survey of how establishments domestically and internationally undertake process monitoring.
- ◆ Submit a discussion paper for evaluation by industry representatives.
- ◆ Develop a Principles and Guidelines document to provide the scientific underpinning of a new process monitoring system.
- ◆ Draft an MHA 3 Process Monitoring document.
- ◆ Present two webinars to inform broader industry of proposed changes and for feedback.
- ◆ Provide an update to the Export Meat Industry Advisory Committee as per previous projects.
- ◆ Provide a final report and Snapshot to AMPC.

4.0 Results

4.1 Undertake a brief survey of how establishments domestically and internationally undertake process monitoring

A survey of how 9 beef, 5 sheep, 3 pork and 1 game meat establishments undertake MHA 2: Process Monitoring was undertaken. The results and analysis of this survey were collated in the document *Meat Hygiene Assessment 2: Process Monitoring – an industry survey*, included in Appendix 1; major findings were that:

1. MHA monitoring in general has been required to respond to domestic and global developments including:
 - Increased market access requirements, both domestically and internationally
 - An increase in the intensity and frequency of audits by regulatory and commercial bodies
 - Significant market diversification, especially to China
 - Introduction of interventions
 - Introduction of a Refrigeration Index (RI)
 - Adoption of a risk-based approach to manage food safety and trade risks
 - Recent chronic labour shortages leading to employment of under-skilled operators

2. To accommodate the above, establishments have tailored template forms, leading to more operations identified for monitoring. For example, the slaughter/dressing template 'baseline' of 27 operations has been increased, with one establishment listing 73 operations on the slaughter floor.
3. While some establishments have retained the '5-area' basis, others have identified up to nine areas important for some of their operations, leading to problems in the way in which the Conformity Index is calculated.

Process monitoring requirements in the United States, Canada, New Zealand, and the European Union were identified. In summary:

1. The Canadian Food Inspection Agency requires a system similar to FSIS and is outcomes-based; neither specifically requiring establishments to monitor operator compliance with work instructions. We believe Australia already complies fully with what is required.
2. New Zealand, by contrast, has no formal process monitoring system, instead focusing verification on hygienic processing of carcasses by checking Zero Tolerances (ZTs) at post-mortem. The regulator has set National Performance Criteria for the prevalence of ZTs and, if these are not met, a complicated 'window' testing regime is triggered. No carcass is allowed to leave the slaughter floor with any visible enteric contamination.
3. The EU seems to align with the US/Canada and NZ in having no formalised process monitoring system but instead leaving it to companies to verify that work instructions are followed.

4.2 Reconstitute the Reference Panel: Industry, Department and AMPC members

The reference panel for this project was reconstituted with the following members:

- ◆ Industry: Michael Bayer, Mick Johnson, John Langbridge, Stacey McKenna, Trevor Moore, Willie Rijnbeek
- ◆ DAFF: Jason Ollington, Mark Salter
- ◆ AMPC: Ann McDonald
- ◆ SARDI Project Team: Jessica Jolley, Andreas Kiermeier, John Sumner

The reference panel met on 8 March, 9 July and 8 October 2024 via video conference to discuss the options papers (see next section).

4.3 Submit a discussion paper for evaluation by industry representatives

The industry survey findings were used to develop discussion and option papers, all of which are included in Appendix 1 (documents 1-5).

Drafts of these documents were discussed with an industry expert panel on 20 February 2024 and subsequently refined prior to discussion with the reference panel on 8 March 2024. Revised documents were disseminated to all participating establishments around 9 April 2024, seeking feedback especially in relation to the following three options put forward for a revised Process Monitoring system:

1. No change
2. Comprehensive change

3. Cessation of MHA monitoring and reliance on the establishment's HACCP system.

The responses from industry were diverse:

- ◆ Two beef and two sheep operations favoured Option 1 (no change).
- ◆ Two sheep and three beef operations were for change, based on simplification of the system to make it risk-based and establishment-specific (Option 2).
- ◆ Two beef operations favoured Option 3.
- ◆ Several establishments did not respond.
- ◆ DAFF favoured Option 2.

4.4 Develop a Principles and Guidelines document to provide the scientific underpinning of a new process monitoring system

Based on the feedback from establishments, a simplified Process Monitoring system was drafted (Option 2) together with a more detailed Principles and Guidelines document to underpin the new monitoring system. These documents were sent to the reference panel and industry participants on 5 June 2024 for feedback and preparation for a video conference to be scheduled for 9 July.

The main principles and guidelines of MHA 3: Process Monitoring are that it:

1. Is company-specific according to the company's identified food safety and trade risks and has monitoring points decided by the company.
2. Has a frequency of monitoring which reflects the risk associated with a specific processing operation.
3. Has no scoring system and hence no Conformity Index.
4. Records deviations from work instructions and implements immediate corrective action.
5. Summarises data generated by each week's process monitoring, product monitoring, microbiological monitoring and ZT detections for review, used to inform preventative corrective action.

The final version of this document is included in Appendix 2.

4.5 Draft an MHA 3 Process Monitoring document

A draft MHA 3 document was prepared for evaluation at the 8 October 2024 meeting of the Reference Panel at which it was decided that to adhere to the principles and guidelines as set out above (Section 4.4) and to emphasise the analytical focus by amending the name to MHA 3: Process Monitoring and Analysis, a final version of which is included in Appendix 2.

4.6 Webinars to inform broader industry of proposed changes and for feedback

Two webinars were held on Tuesday 29 October and Thursday 31 October 2024, attended by 39 and 25 participants (including presenters), respectively.

4.7 Outcomes provided to the Export Meat Industry Advisory Committee (EMIAC)

An out-of-session paper prepared for the EMIAC Food Safety and Animal Health Subcommittee is attached as Appendix 3.

5.0 Discussion

In 2017, AMPC commissioned SARDI to review how the Australian meat industry monitors its processes, products and microbiological profile. The report, *Process Control Monitoring – Is there a better way?* (AMPC 2017-1068) was a critical analysis of the ESAM, PHI and MHA programs.

Its findings led to industry trials for an alternative microbiological testing regime and to development of MHA 3: Product Monitoring via projects *Process monitoring for the Australian Meat Industry – A Comparative Industry Trial* (AMPC 2018-1070); *Visual monitoring of carcass and carton meats – a system for the 21st century* (AMPC 2019-1066) and *Meat Hygiene Assessment 3 – an Industry Trial* (AMPC 2021-1091).

The final item in modernising industry monitoring is the current, *Review of Meat Hygiene Assessment (Process Monitoring)* (AMPC 2024-1004). In undertaking the review, SARDI followed the same *modus operandi* as previous projects:

1. Seeking advice and approval from a Reference Panel comprising industry, Australian Meat Industry Council, AMPC and DAFF.
2. Providing the panel with discussion and option papers.
3. Simplifying MHA 3 by removing the prescriptive elements of the current (MHA 2) version.
4. Opening discussion phases to industry members who had expressed an interest in participating in the process.
5. Developing a final version of MHA 3: Process Monitoring and Analysis which is risk-based and unique for each establishment.

It should be noted that the change in title stems from the linkage between *MHA 3: Process Monitoring* and *MHA 3: Product Monitoring*, based on the premise that if the product manufactured over the monitoring period (e.g. the working week) is of satisfactory quality, its processes must also have been satisfactory.

Thus *MHA 3: Process Monitoring and Analysis* is integrated both with the establishment's microbiological data and with visual assessment of its products. It retains the online observations ("walk around") at frequencies depending on how the establishment rates the risk of individual unit operations and records deviations from work instructions as opportunities to improve the operations. It is this last element which has led to the change in title to include Analysis of the establishment's processes.

6.0 Conclusions / Recommendations

An iterative process of consultation between industry and the regulator has led to the development of MHA 3: Process Monitoring and Analysis based on integration with MHA 3: Product Monitoring.

It is recommended that a trial be undertaken over a 3-month period in which establishments present to DAFF summarised information of data gathered, the manner in which they have been analysed and how the establishment has used the data to review and improve their unit operations.

It is noted that a number of establishments expressed their interest in participating in the current project and it might be appropriate for them to be offered a position as trial establishments.

7.0 Appendices

Discussion, options papers, EMIAC paper and final MHA 3: Process Monitoring and Analysis are available as standalone files which accompany this report.

Appendix 1: Discussion and options papers

1. Discussion paper 1: Meat Hygiene Assessment 3: a proposed Process Monitoring system – principles and guidelines
2. Discussion paper 2: Opportunities for improvement of MHA 2: Process Monitoring
3. Discussion paper 3: Context for the development of MHA in the mid-1990s
4. Meat Hygiene Assessment 2: Process Monitoring – an industry survey
5. Options for MHA 3: Process Monitoring

Appendix 2: MHA 3: Process Monitoring and Analysis

Appendix 3: EMIAC FSAHSC out-of-session paper