



AMPC

AUSTRALIAN MEAT PROCESSOR CORPORATION LTD

2013

ANNUAL REPORT



CERTIFICATION

On 28 November 2013 the Australian Meat Processor Corporation (AMPC) Board authorised this Annual Report with the following resolution:

This Annual Report for the year ending 30 June 2013 is approved in accordance with the following certification – the Board accepts responsibility for the preparation and content of this Report in accordance with Australian Accounting Standards and AMPC’s Deed of Agreement with the Australian Government.

CHAIRMAN

Gary Hardwick

DEPUTY CHAIRMAN

Stephen Kelly

CHIEF EXECUTIVE OFFICER

Michelle Edge

DIRECTORS

John Berry

Brian Carey

David Foote

Brian James

Tom Maguire

Ray Johnson

Peter Noble

THIS REPORT

This Annual Report presents the AMPC’s programs, outcomes and financial performance during the financial year 2012-2013.

It comprises the following sections:

- AMPC at a glance;
- Overview of the Company, our strategic framework and investments;
- Report to stakeholders that outlines AMPC’s performance, program highlights and progress in key Research Development & Extension (RD&E) and Marketing activities;
- Directors’ Report and Audited Financial report.

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AMPC AT A GLANCE

The Australian Meat Processor Corporation (AMPC) is a national Research & Development Corporation that represents the Red Meat Processing Industry throughout Australia. AMPC's mandate is to support Research, Development and Extension (RD&E) initiatives that are directed at improving the sustainability and efficiency of the meat processing industry.

Red meat processor levies are strategically invested in Research Development & Extension (RD&E) and Marketing programs aimed at delivering improvements to the processing sector and providing significant benefit to the whole of the red meat industry and the broader Australian community.

Vision

AMPC's vision is for a sustainable, profitable and competitive red meat processing industry that meets national and international customer, consumer and community expectations.

Mission

AMPC's mission is to maximise the efficiency, viability and sustainability of the red meat processing industry sector by supporting the development of sound, scientific solutions that will:

- Improve the long term efficiency and competitiveness of the industry;
- Enhance the sustainability of the industry;
- Assist to protect, secure and maintain market access;
- Enhance capability;
- Enhance overall productivity and performance of the meat processing sector.

To achieve the above, AMPC supports projects in a wide range of areas including meat science, automation and technology, environment and sustainability, animal health, biosecurity and animal welfare, traceability and market access. AMPC focuses on:

- Promoting Australian meat in the domestic and international marketplace;
- Developing RD&E initiatives that address issues in meat safety, quality and product integrity, capability, environment, livestock management and other elements of the supply chain;
- Establishing projects and capability that assist in protecting the economic, environmental, health, safety and social well-being of the meat processing industry.

Organisational partnerships

Industry research, development and adoption activities are conducted through a system of willing partnerships designed to deliver effective RD&E outcomes.

AMPC participates in joint or core RD&E initiatives through a partnership with Meat and Livestock Australia Limited (MLA).

AMPC works with Government to develop and deliver RD&E activities that underpin Australia's National Research Priorities.

AMPC also operates in partnership with the Australian Meat Industry Council (AMIC), to ensure that RD&E programs are directed at the areas of most strategic need for industry.



“ AMPC works collaboratively with other organisations including a wide range of commercial companies and RD&E providers that operate across the broader red meat supply chain to ensure that processor collected levy funds are appropriately invested to deliver tangible results for the red meat Industry, rural Australia and for the nation as a whole. ”



CHAIRMAN'S REPORT

Gary Hardwick, Chairman

The red meat processing sector is a significant contributor to the Australian economy as well as making a substantial contribution to the nation's export markets. When flow-on effects are taken into account, the industry contributes \$16.2 billion in Gross Domestic Product (GDP) or 1.3 per cent of total GDP.

The meat processing industry has been integral to Australia's past economic success and will continue to be in the future. Opportunities include a projected 77 per cent increase in global food demand by 2050, and the evolving food choices of a growing Asian middle class. In addition to these opportunities, there remain challenges— from climate change and the need for investment into carbon emissions mitigation technology, to variations in supply of livestock and world pricing, to cost competitiveness in world markets and issues in attracting and retaining employees.

As the meat processing industry's RD&E service body, AMPC continued to invest in research & development, education and training. A key area of focus is the investment into market access. Ready access to a diverse range of both domestic and international markets is one of the necessary foundations for a profitable meat processing sector – as it is for other sectors of the Australian meat and livestock industry. In order to help shore up future profitability, AMPC, along with livestock producers, co-funds a Market Access Program, operated by MLA. The Market Access Program aims to help secure continued access to the world's major meat markets and to position the red meat industry favourably in new and emerging markets. The Program is underpinned by strong working relationships between MLA, AMPC, peak industry policy councils and the Australian Government which values a "whole of industry" effort in collaboration.

This year, developments in overseas markets were closely monitored, and in-market networks leveraged where necessary to avoid trade interruptions. Import regulations and competitor access arrangements were closely monitored and representations made on potentially adverse developments and for specific market access issues that arose, AMPC investment enabled, in conjunction with industry and government, a response capability to help manage and alleviate the impact of these market impediments. Although the World Trade Organisation (WTO) round continued to stall, low level monitoring of developments was maintained and the two key WTO proposals of interest to red meat and that made some progress were trade facilitation and tariff quota administration. For the first time since 2002, Australian sheepmeat exports to India recommenced during 2012-13 with the partial resolution of certification issues that had previously presented a major non-tariff barrier to trade. The trade enhancing outcome was the result of a joint effort between industry and government. An industry-funded review into the impact of more than 260 red meat technical barriers to trade (TBT) in 40 key export markets was completed and found that the barriers were mainly around issues of product age and expiry date conditions; market listing and accreditation restrictions; product entry restrictions (bans); tariff quota administration, import permit issues; and increased packing costs from labelling requirements.

In response to this and the many other issues facing industry, AMPC set about developing its new Strategic RD&E Plan. This work built

on the previously published *AMPC Environmental Future Scan to 2030: The Megatrends* – which identified the major issues impacting industry in the short, medium and long term future.

AMPC has undergone some changes to its Company operations that will see it become more directly responsible for processor strategy development and RD&E project delivery. As the custodian body for processor levies on behalf of meat processors, AMPC has successfully worked in partnership with MLA over many years to fund important strategic investments in the RD&E of solutions to key processor challenges.

Recently, it has been determined in discussion with MLA and the Australian Government Department of Agriculture, that following the signing of its Statutory Funding Agreement, AMPC can now better meet the RD&E needs of processors and its statutory obligations to government by assuming greater direct project oversight and operational delivery of processor RD&E projects to its membership.

Moving forward under new arrangements recently agreed with MLA and the Department of Agriculture AMPC members and AMPC staff will be more directly involved in the operations of processor RD&E in areas traditionally invested in by AMPC, but formerly and principally delivered by MLA. These changes represent a significant shift in the role of AMPC from investor to the delivery of RD&E for its processor members and an exciting positive change to how processor levies will be managed into the future.

As a consequence, AMPC will be revising its industry consultation process with the membership and members will be advised of this course of action and invited for input shortly. AMPC looks forward to setting about implementing these new directions. A focus on strengthening partnerships will remain at the forefront, as well as delivery of plant initiated projects to members. The continued nurturing of these partnerships are fundamental to AMPC's ability to deliver solid outcomes on behalf of industry.

I wish to thank the Directors on the AMPC Board for their significant contribution to the Company and its activities. In particular, the support provided by Stephen Kelly, Deputy Chairman and Peter Noble, Chairman of the Audit and Risk Committee, is greatly appreciated.

I would also like to thank the CEO and the AMPC team for their input to Company activities and last but not least I acknowledge the Board's appreciation of member support throughout the year.

I hope you enjoy the 2012-2013 Annual Report to stakeholders.



CHIEF EXECUTIVE OFFICER'S REPORT

Michelle Edge, Chief Executive Officer

This year has seen some marked changes in relation to how AMPC does business on behalf of processors, including, but not restricted to, improvements in engagement and transparency to members, wider investment in key processing industry priorities, more partnerships with key RD&E provider agencies and Centres and the delivery of broader communication of investment across the industry. AMPC has set about re-establishing new company branding and corporate messaging, developing new investment strategy, enhancing and managing its approach to corporate efficiency and risk management, improving its communication strategy and materials and providing more regular reporting of RD&E activity. At least 113 factsheets, 4 webinars, 54 reports and 2 major annual project summary reports on RD&E project activities and outcomes were disseminated to 1398 processor representatives on a regular basis.

Over the next 5 years, the AMPC will potentially make investments of \$60 million in RD&E and \$33 million in marketing to support a competitive Australian meat processing sector and contribute to the productivity of the broader red meat supply chain.

How AMPC will invest in and direct this research is outlined in our recently published *Red Meat Processing Strategic Research, Development and Extension and Marketing Plan 2013–17*. To identify these priorities, AMPC engaged in and conducted extensive consultation with our membership, Government and key stakeholders. Our primary stakeholders, Australian processing representatives, the Australian Government, MLA and the members of the AMIC, have worked closely with us to identify and define their strategic research priorities. There were of course, a wide array of additional stakeholders that we consulted with, including the other red meat industry councils, Rural Research and Development Corporations, members of the Red Meat Advisory Council (RMAC) and supply chain partners.

As our stakeholders have requested, over the next 5 years AMPC will place a greater emphasis on targeted and defined research and on ensuring that research outcomes can be adopted by the red meat processing industry, as well as focusing on enhanced extension, adoption and commercialisation approaches to enhance industry return on investment.

A more strategic approach has now been implemented in key portfolio areas, including the coupling of RD&E projects with building capability initiatives (new post-graduate programs in meat science), investing in a collaborative manner (through strategic partnerships with key RD&E Centres of Excellence and research consortiums and teams, and the inclusion of extension to the majority of research projects to make sure that impacts can be seen directly with processing company members.

Our target was to ensure an increased investment of \$5,229,000 over a 3 year period in identified and specific areas of RD&E on behalf of processors. This has resulted in increased investment of \$5,550,000 since 2011, comprising an increase in Core (industry wide) RD&E investment of \$3,000,000, PIP investment of \$1,800,000, and \$750,000 in Joint investment. These increases have been established in key RD&E areas such as meat science, capability development, product innovation, food safety and product integrity, livestock management, traceability, strategy and brand development, extension, training and biosecurity.

AMPC has sought to spend more direct time with processors, conducting visits to sites and involving more than 48 businesses in industry-wide RD&E projects as to ensure adoption, practicality and direct access to scientific capability for our members and we have greatly expanded our RD&E provider engagement through a range of new collaborative and competitive grant processes.

It is recognised that our new *Red Meat Processing Strategic Research, Development and Extension and Marketing Plan 2013–17* is to be considered interim until 2015 on the basis that other industry and stakeholder Strategic Plans that influence the direction of AMPC investment will be developed during this time. These plans include the *Meat Industry Strategic Plan (MISP)*, the *Beef Industry Strategic Plan*, the *Sheep Industry Strategic Plan* and *MLA's Strategic Plan*. The high degree of co-investment and collaboration across organisations in the red meat supply chain dictates that the outcomes of these other planning processes must be taken into account as part of AMPC's ongoing strategic and operational planning processes. To communicate this, during 2013, AMPC released the summary report of the Red Meat Processing Industry's contribution to the overall MISP. This report is one of the evaluation activities undertaken to underpin AMPC's strategic planning process and provides a summary of AMPC's contribution to the MISP strategic imperatives on behalf of the processing sector.

As presented by the Chairman, it has been determined in discussion with MLA and the Australian Government Department of Agriculture that AMPC can now better meet the RD&E needs of processors and its statutory obligations to government through assuming direct oversight and operational delivery of processor RD&E projects to its membership.

These changes represent a significant shift in the role of AMPC from investor to the delivery of RD&E for its processor members. Our AMPC team has grown to provide enhanced services to processor members and to capitalise on previous investments through more targeted and strategic engagement, extension and commercialisation initiatives.

To this end, AMPC sought to establish a revised approach to consultation and member engagement that enhances the development of future investment strategy, decision making and member involvement in key areas. AMPC's consultation will involve 6 new committees covering a wider array of RD&E topic areas, comprising processor, technical and research representatives and that focus on identifying new RD&E priorities, developing investment strategic, qualifying areas of market failure that require and warrant research and assessing strategic fit and industry and community outcomes through evaluation. In addition, AMPC will seek to enhance its broader and overall reporting structure, which will see at least 2 forums for reporting outcomes of investments to processors each year, enabling all members to take part.

I would like to acknowledge our key stakeholders and partners who have supported our new and improved approaches in RD&E investment and delivery. I would also like to offer my thanks on behalf of the team, to the many processing members that have contributed to our projects and strategies for a new AMPC approach to investment. Finally, I thank the AMPC Board for their support in ensuring that we can collectively deliver strong outcomes to the red meat processing industry.

ABOUT AMPC



The red meat processing sector is a significant contributor to the Australian economy as well as making a substantial contribution to the nation's export markets. When flow-on effects are taken into account, the industry contributes \$16.2 billion in gross domestic product or 1.3% of total GDP. It also underpins more than 148,000 full-time equivalent (FTE) jobs across all sectors of the economy.

AMPC is the national Research & Development Corporation that invests in research, development, extension and marketing on behalf of red meat processors in Australia. We are governed by a Board of Directors and our national operations are directed from our professional RD&E team located in Sydney.

AMPC's mandate is to support RD&E and Marketing initiatives towards improving the profitability, sustainability and efficiency of the meat processing sector.

In 2013, AMPC has 124 members and represents 150 sites with over 97% of Australia's cattle, sheep and goat meat processing capacity, as industry has undergone marked consolidation in recent times. In 2013, processors paid levies of \$18.06M. AMPC project expenditure covers \$15.31m in 2013, where half of this is directed towards joint investments with MLA for the entire red meat industry supply chain.

Corporate Governance

AMPC recognises the value of strong corporate governance. As a Corporation responsible for the investment of statutory levies provided by processors, AMPC must meet and demonstrate corporate planning and reporting processes and requirements.

In addition, AMPC operates to provide the same governance requirements of its partner industry services body, MLA, as MLA provides matching funding for processor contributions from the Australian Government.

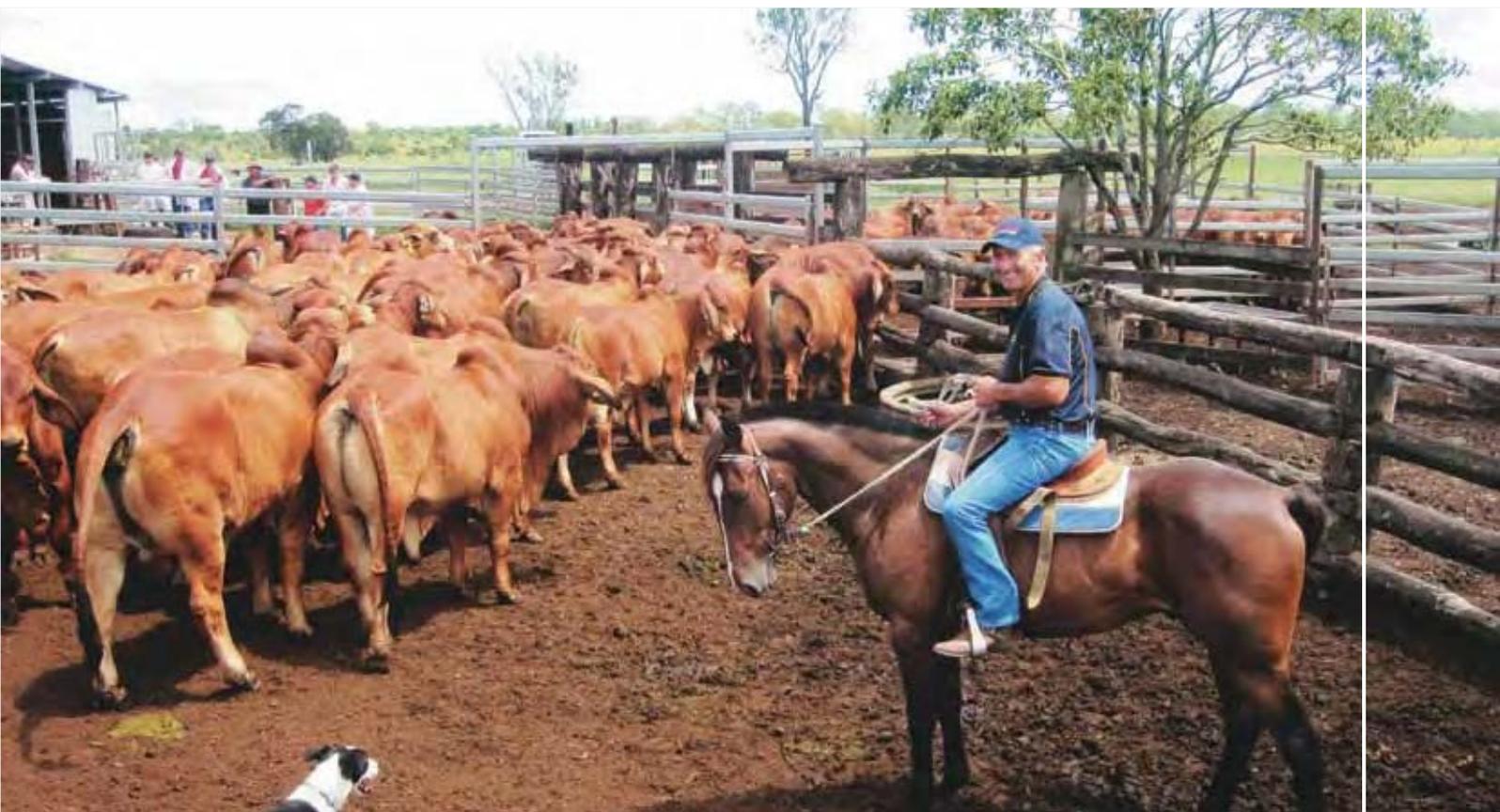
Through its Board, AMPC is accountable to the Australian Government through the Minister for Agriculture. Further information on AMPC's Governance processes is provided in later sections of this report.

Our objectives

AMPC's primary objective is to maximise the efficiency, viability and sustainability of the red meat processing sector by supporting the development of sound, scientific solutions that will:

- Improve the long term efficiency and competitiveness of the industry;
- Enhance the sustainability of the industry;
- Assist to protect, secure and maintain market access;
- Enhance capability;
- Enhance overall productivity and performance of the meat processing sector.

AMPC supports projects in a wide range of areas including meat science, automation and technology development, food safety, capability building, extension, education, practice change, environmental sustainability, climate change, animal health, biosecurity and animal welfare, traceability and market access.



AMPC focuses on:

- › Promoting Australian red meat in the domestic and international marketplace;
- › Developing RD&E and Marketing initiatives that address issues in meat safety, quality and product integrity, capability, environment, livestock management and other elements of the supply chain;
- › Establishing projects and capability that assist in protecting the economic, environmental, health, safety and social well-being of the meat processing sector.

This Annual Report to stakeholders focuses on AMPC's activities and outcomes for the 2012-2013 financial year, aligned with our strategic imperatives and structured according to our strategic and annual operating plans.

Our *Annual Operating Plan* outlines all AMPC's strategic imperatives, strategies to achieve them, planned activities for the year, funding explanations and key performance indicators. AMPC acknowledges the matching funds provided by the Australian Government via MLA, to support the research and development detailed in this report.

There are 3 programs in which AMPC invests to deliver RD&E and Marketing outcomes to the meat processing industry:

- › **The Joint program**, which is funded by several levy streams (processors, producers, feedlot and with matching Government contributions) is designed to deliver supply and value chain activities which support food safety, eating quality, increasing market access and growing demand for meat and meat products. In collaboration with the other red meat organisations and councils, AMPC contributes to the development of strategic objectives and directions for the whole of the red meat and livestock industry and annual operational targets and Key Performance Indicators (KPI's) for joint activities. MLA deliver this program on AMPC's behalf.
- › **The Core RD&E programs**, are funded through processor levies and matching Australian Government RD&E funds. The Core program represents industry-wide RD&E activities and are aimed at ensuring outcomes and benefits are available to all levy payers, the processing industry and the broader supply chain and Australian community.
- › **The Plant Initiated Project (PIP) Program** allows processing businesses to identify and undertake RD&E projects at their own enterprises which are aimed at delivering benefit to the whole of the red meat supply and value chain and the broader Australian community.

AMPC PARTNERING WITH GOVERNMENT, MEAT AND LIVESTOCK AUSTRALIA AND THE AUSTRALIAN MEAT INDUSTRY COUNCIL

Partnering with Government (Department of Agriculture)

The Australian Department of Agriculture's role is to develop and implement policies and programs that ensure Australia's agricultural, fisheries, food and forestry industries remain competitive, profitable and sustainable. Based on legislated and industry funding agreements, the Australian Government collects industry levies for the purpose of RD&E and/or Marketing, including those invested in by AMPC.

AMPC's RD&E investments are guided by the strategic research priorities of the Australian Government and the Australian meat processing sector. Our RD&E and Marketing revenue comes from levies on the processing of livestock and matching contributions from the Australian Government.

AMPC addresses the Government's priorities by:

- Aligning the current and previous corporate plans with the Government's priorities, which are incorporated into their strategies. This includes the establishment of specific programs to address particular priorities. The current AMPC Strategic Plan specifies strategies that will contribute to these priorities;
- Ensuring that the RD&E plans for individual programs address the Government's priorities by regularly advising AMPC's providers and researchers of the Government's priorities;
- Ensuring that AMPC's annual reports and annual operational plans have sections reporting on the outcomes from AMPC investments that contribute to the priorities.

Partnering with Meat and Livestock Australia (MLA)

AMPC participates in joint and core RD&E initiatives through a collaborative Research Development Corporations (RDC) partnership with the producer body RDC, MLA, to ensure that activities are delivered for both the processing sector and the wider red meat supply chain.

MLA, AMPC and all of the Rural RDCs representing industry sectors are accountable to both industry and Government for their expenditure. The RDCs invest in RD&E and Marketing to improve the productivity and delivery of high quality products in order to underpin the competitiveness and profitability of Australia's agricultural, fish and forestry industries. This Government-Industry partnership model has been operating successfully for over 20 years and now provides more than \$470 million in annual RD&E expenditure.

Specifically, MLA is the Commonwealth designated Service Provider to the red meat industry under the Red Meat Memorandum of Understanding (MOU), therefore AMPC expenditure involves co-investment and collaboration with MLA for the investment and delivery of processor industry activities.

MLA and AMPC partner through a shared Agreement that provides the arrangement for MLA to deliver RD&E and Marketing services to meat processors on behalf of AMPC for defined areas.

As outlined in the introductory pages to this Annual Report, AMPC is now taking a greater role in the direct project and program delivery of several RD&E portfolio areas in agreement with MLA, as part of ongoing and continual improvement of the AMPC business model and its delivery to industry and levy payers.

The Australian Meat Industry Council (AMIC)

AMPC operates in partnership with the AMIC, the red meat processing industry's advocacy and advisory body. AMIC, a collective of processor levy payers as well as other non-levy paying members, provides advice through many different advisory councils for key gaps, priorities or needs where in some cases, RD&E is required to gain greater understanding, technical knowledge or to provide a scientific solution. AMPC integrates AMIC advice on priorities and needs in its consultations with members, partners and Government and in the establishment of its annual portfolio of investments. AMPC also takes account of the priorities and needs established through similar mechanisms by MLA who also liaise with AMIC directly for advice on areas and activities that MLA are responsible for delivering on behalf of AMPC under our shared partnership agreement.



AMPC'S RD&E AND MARKETING PROGRAMS



Summary

The partnership of Industry, Government and private sector investment into RD&E and Marketing programs in the meat processing industry during 2012–2013 has made an important contribution to the industry and the broader Australian community.

AMPC's programs are focussed on increasing industry productivity and net value through sound, scientific solutions. The main objective is that processing businesses and their supply chains continue to be innovative, productive, efficient and adaptive.

Within this context, the diagram on the next page illustrates the key strategic areas.

AMPC RD&E AND MARKETING PROGRAMS





OUTCOME 1

Enhancing domestic and global competitiveness

► HIGHLIGHTS

Strategies for unlocking market potential and research to address current or emerging market access barriers are of major importance to the red meat processing industry's sustainability, profitability and future net value.

Currently, industry's co-funded market access program provides market access resources to the wider industry, focusing on monitoring trade developments in overseas and domestic markets; undertaking market access research; developing industry-wide positions to support submissions to Government on trade priorities; and lobbying for market access improvements.

To date, significant effort has been directed towards defending the current status of meat markets and where possible, securing improvements to these conditions, as well as responding to unexpected issues as they arise. In partnership with Government, industry needs to continue to pursue the broad range of initiatives to address the multidimensional measures now used to restrict trade. These include not only mounting arguments to address border measures that serve as barriers to trade, but also initiatives to remove barriers based on animal disease, animal welfare and food safety standards. Furthermore, the future of market access internationally for Australian meat products is directly linked to maintaining and improving access to established major markets as well as gaining access to emerging markets.

This strategic imperative includes market access related research, as well as research and development directed at

product integrity related activity. This program of investment for AMPC is underpinned by the following key focus areas:

- › Researching trade and technical market access barriers towards developing agreed strategy in industry and with Government;
- › Applying sound, scientific solutions to mitigate and remove trade barriers and enhance opportunities into existing markets;
- › Building capability in key technical and trade disciplines to support ongoing response to market access, trade negotiations, technical and regulatory issues as they arise;
- › Maximising the market access options for red meat processors through effective trade reform activities;
- › Responding to domestic and international market expectations by effectively demonstrating and 'describing the system' under which red meat is processed (and produced).



Benchmarking trade and market access needs

Australia's beef and sheepmeat exports are subject to numerous trade barriers internationally, and accordingly there are numerous market access trading environments in which these barriers and conditions are negotiated. Determining market access priorities within the diverse beef and sheepmeat industry, then ensuring those priorities are taken up by the funding bodies, industry representatives and Government, and subsequently secured in negotiations is recognised to be complex.

Quantifying the investments made in market access necessitates defining market access. AMPC conducted a study that examined the priorities for market access, and that utilised the WTO definition of market access, that is "Market access for goods in the WTO means the conditions, tariff and non-tariff measures, agreed by members for the entry of specific goods into their markets". Currently, MLA, under the MOU, are the designated service provider for market access activities. On this basis, MLA are responsible for the development, design and delivery of market access activities for the entire red meat industry. Other funding bodies, including AMPC, LiveCorp and Government, contribute funding to this model. AMPC invests at least \$4.32 million per annum in supporting market access activities that are delivered by MLA in accordance with the MOU. This project involved structured interviews with representatives of meat processing companies to establish the required market access outcomes and how these might be delivered. It was apparent from the results that there is a mix of markets that are priorities. It was also apparent that there is a mix of barriers to market access identified as priorities in

the above markets. This mix includes the traditional tariffs and quotas as well as the more emerging barriers such as labelling and other technical barriers as well as plant certification. The mix of barriers is addressed by different agencies and the activities are funded differently. Issues that qualify for RD&E or Marketing funding are delivered and funded by the RDCs. The consultation mechanisms in place for RD&E are reasonably well developed, whereas the other areas, may not be as well developed with sufficient capacity or funding as they relate often to regulatory matters. This project will be continued through to 2014 and provide further background to aid in establishing a red meat processing market access strategy and approach that reflects meat processors key interests and that can be integrated with the activities of AMPC, MLA and AMIC accordingly.

Developing strategies to remove market access barriers

For the first time since 2002, Australian sheepmeat exports to India recommenced during 2012-13 with the partial resolution of certification issues that had previously presented a major non-tariff barrier to trade. The trade enhancing outcome was the result of a joint effort between industry and government. While exports recommenced slowly, India's rapidly expanding middle class means this market may hold significant potential over the longer term.

An industry-funded review into the impact of more than 260 red meat TBT in 40 key export markets was completed in June 2013. The research found that 136 of these TBTs had significant trade restricting effects, with a total impact estimated at \$1.25



billion – over half of this value associated with TBTs negatively impacting the beef trade. The barriers were mainly around issues of product age and expiry date conditions; market listing and accreditation restrictions; product entry restrictions (bans); tariff quota administration, import permit issues; and increased packing costs from labelling requirements. A concerted effort will be needed to address these TBTs in order to further improve trading conditions.

Research was undertaken to support trade reform advocacy in the Free Trade Agreement (FTA) negotiations – particularly in-market advocacy research in Japan and the costs of not securing an FTA with Korea.

Value adding knowledge + build new ideas

Biannual reports of Global New Product Development trends and findings from Trade shows and conferences of emerging science and technology platforms were completed and disseminated.

The reports include collation of market intelligence on new products and identification of trends in order to stimulate new red meat product development.

Drawing on this information and on ideas from trade shows such as IFFA, Germany; International Non-thermal Food Processing Workshop – Food Innovation: Emerging Technologies and Applications (FIESTA), Melbourne; and Fine Foods Australia series, 3 areas of promise were identified:

- Pulled Meats – proof of concepts using Belgium shredding machine;

- Using combination of technologies (moisture infusion; High Pressure Processing (HPP), SmartShape) to cook medium well steak in an impingement (pizza) oven;
- Developing protocols for grading the quality of De-sinewed Minced Meat (DMM) using X-ray / NIR assays.

Defending existing favourable market access conditions in overseas markets

Through the Market Access Program collaboration occurred with peak industry councils and Australian Government officials to address threats to red meat export trading conditions. Developments in overseas markets were closely monitored, and in-market networks leveraged where necessary to avoid trade interruptions. Import regulations and competitor access arrangements were closely monitored and representations made on potentially adverse developments. For specific market access issues that arose, MLA in conjunction with industry (and AMPC) and government provided a response capability to help manage and alleviate the impact of these market impediments.

Position the Australian meat and livestock industry for the WTO Doha round

Although the WTO round continued to stall, low level monitoring of developments was maintained. Two key WTO proposals of interest to red meat – and that made some progress – were trade facilitation and tariff quota administration – both of which are targeted for further progress at the WTO Ministerial meeting scheduled for December 2013.



Position industry for FTA negotiations

MLA on behalf of the red meat organisations including AMPC, worked closely with the Australian Government to ensure trade negotiators were aware of and incorporated industry priorities in all bilateral FTAs under negotiation. This involved submissions prepared on the Indonesia-Australia Comprehensive Economic Partnership Agreement; the Indonesia-Australia Business Partnership Group; the Regional Comprehensive Economic Partnership Negotiations (16 member countries); Australia in the Asian Century Country Strategies; the Trans-Pacific Partnership Agreement (12 member countries); Australia-Japan FTA; and the Australia-Korea FTA.

The need to secure an FTA that eliminates the 40% tariff on Australian beef entering Korea has become particularly urgent given the growing competitive disadvantage we face in this market compared to beef from the United States (US). The 40% tariff on US beef is being eliminated over 15 years, and at 1 January next year, US beef will have an 8% tariff advantage. As a consequence, a concerted industry advocacy effort has been directed at expediting this FTA (both in Australia and Korea) and industry will continue working closely with the new Australian Government in pursuit of an advantageous outcome.

Negotiation of an FTA with Japan progressed, with the commitment of both sides to deliver an agreement as soon as possible. Industry, via the Australia-Japan FTA industry taskforce, has continued to be very closely involved with the deliberations and provided into negotiating strategies;

The Trans-Pacific Partnership (TPP) agreement also required increased focus over the past 12 months, especially following the inclusion of Canada, Mexico and Japan – none of which currently offer Australia preferential access. Support was leveraged from the National Farmers' Association trade committee, the Five Nations Beef Alliance partners and the Tri-Lamb Group in publically advocating for a TPP outcome that delivers substantial improvements in market access and new trade opportunities. This activism has been well received by TPP negotiating parties.

OUTCOME 2

Delivering to customers and consumers

► HIGHLIGHTS

The consumer and societal expectations regarding industry and corporate accountability are progressively increasing due to changed value systems. To maximise delivering to customers and consumers and to increase the demand for red meat products, the Australian meat processing sector has, and will, focus more on product development, differentiation and the substantiation of product quality parameters in the next 5 years.

Programs are directed at category development and management to produce enhanced business results by focusing on delivering consumer value. Research will continue to be needed to underpin objective measures for eating quality and consistency and the utilisation and promotion of meat quality attributes to differentiate our products in key markets, both domestically and overseas. The current measures of end user and consumer confidence require further analysis, such that the influences of purchasing behaviour can be better measured against customer attitudes and baseline data reflecting behaviour can be quantified and regularly benchmarked over time.

Industry considers that investment into meat science disciplines with expertise in biometrics and statistics, is imperative for the future expansion of quality standards for meat in Australia. Related activities in this program include influencing culinary educational programs and national and international chef delegations. Further work in this program involves building on the current platform of eating quality

with further research into genetics, genomics and functional foods, as well as other attributes in areas of integrity (e.g. shelf life), branding (e.g. packaging/cuts/cooking), processing technologies and new product development will be a key focus in the next 5 years.

This strategic imperative is underpinned by the following key focus areas:

- › Understand what consumers and customers want in relation to red meat products and how these expectations would be met;
- › Demonstrating the importance of red meat in the diet;
- › Delivering wholesome and consistent eating quality;
- › Enhancing and communicating the value proposition of the red meat category to the customer, consumer and community.



Development and validation of a probe to measure meat quality for on-line application (A.MQA.0002)

On-line technologies for measuring meat quality present both a challenge and potential for the meat industry. Although challenging, the successful development of online technologies that are capable of operating under commercial conditions have the potential to provide accurate, robust predications of the traits of interest of industry.

This project aims to establish the ability of the probe to predict tenderness and other traits and aid the commercial application of the probe whilst providing the framework for a student to undertake a PhD in meat science. Initial findings indicate that using Raman Spectra to predict shear force in topside after 5 days of ageing was more precise than using traditional indicators of shear force such as pH, sarcomere length or cooking loss. These initial findings serve as confidence to further evaluate this technology and define what biochemical and biophysical changes the probe is detecting in relation to tenderisation, which will underpin the next steps of this PhD program.

Influence of nutritional regime (grain, grass, brassica) on sheep meat texture and flavour (A.MQA.0007)

This project investigated the effects of specific grass and grain species feeding regimes and the effect these feeds have on meat quality post slaughter. Specifically, this project is currently investigating the relationship between sensory properties and chemical and physical measurements and flavour components

in lamb. These feeding regimes are currently undergoing evaluation by the development of a fully descriptive sensory vocabulary and flavour profiles of sheep meat in order to clarify whether some specific feedstuffs produce unique flavour signatures and allow insights into the correlation of any sensory differences to consumer acceptance.

Through the use of integrated and comprehensive analysis from electronic sensory methodology including gas chromatography-olfactometry and mass spectrometry, the volatiles identified to be present in both brassica samples and in raw meat samples will help clarify our understanding of these interactions. This project is currently in the final stages and due for completion in early 2014 with final outcomes to recommend specific feeding regimes for use to sheep producers that, have no impact on consumer acceptability, and assist processors to better select product suitable for specific supply chains and market requirements.

Manipulating process conditions to enhance lamb meat colour stability (A.MQA.0008)

The purpose of this project is to improve colour stability in lamb meat using a supply chain approach focused around measurement of bloom and colour related areas.

A range of different techniques have been used to measure colour development related mechanisms, with literature suggesting reliance on techniques based on colorimeter and spectrophotometric data for meat colour R and D. Meat colour is generally reported in a form representative of colour at time of measurement with potential to improve interpretation of colour data as collected with existing methods and to explore



novel ways of using colour data. The results arising from this study will potentially assist with developing techniques for use by industry.

Despite being due for completion at the end of 2015, this project has recently completed a comprehensive literature review and initiated experimental research focused on identifying current practice and optimising processing conditions for colour stability with an adoption phase working with supply chains.

The experimental phase is ongoing and will utilise and build upon outcomes from the Sheep CRC which has demonstrated that lamb meat colour can be influenced by processing conditions and specifically the rate of pH decline, due likely to an effect on “bloom” depth.

Effect of initial muscle biochemical composition on micro growth and eating quality of long aged beef, destined for export market (A.MIS.1004)

The red meat processing industry widely uses vacuum packaging to store primal cuts for both domestic and export in international markets. In order to accurately ascertain use by dates on vacuum packaged products, processors require accurate and robust information on the shelf life of their products. This data includes microbiology measures including total viable count (TVC) and lactic acid bacteria (LAB). Previous research has suggested that shelf-life of up to 20 weeks could potentially be achieved by slowing the rate of bacterial growth due to the intrinsic biochemical properties of meat having a direct link to the growth retardation of these microorganisms. This project aimed to investigate the muscle biochemical

properties, storage conditions, time of storage and eating quality attributes of packaged and aged beef product.

Samples of vacuum-packed beef striploins from the carcasses of 3 different meat colour score ranges were collected from 3 export abattoirs in Queensland. The primal cuts were stored at -1°C for up to 20 weeks and opened for assessment at regular intervals. The microbiological, biochemical, visual and sensory measures were made at 0, 2, 8, 12, 16 and 20 weeks after packing.

Findings from this study showed that samples with a pH below 6.1 and a meat colour score less than 4 were acceptable following 20 weeks storage with samples measuring a pH of less than 5.7 displaying a lower level of microbial growth.

This project is now complete and the report is available upon request.

Effect of Intramuscular Fat (IMF) on beef meat structure, flavour generation, release and consumer acceptability (A.MQA.0001)

This project investigated the development of analytical and sensory techniques to gain insights into the effect of IMF on beef quality and sensory properties. This project aimed to quantify and further understand the role of IMF in the generation of cooked beef flavour.

This study utilised beef strip loins from grass- and grain-fed Angus and grass-fed Wagyu, ranging from low to high IMF, that were subjected to sensory evaluation and flavour analysis. A wide range of marbling scores were obtained across all

samples, allowing for clear differentiation between groups of low, medium and high marbling scores. A trained panel was then engaged to develop an appropriate beef vocabulary to measure sensory attributes across the samples. More than 30 consensus attributes were developed for final application to assess beef odour, flavour, taste and texture attributes. Most sensory attributes were directly correlated to the level of marbling regardless of the breed or feed type. More subtle flavour and texture differences were elucidated when breed and feed comparisons were carried out.

Preliminary data analysis has indicated the potential of these techniques to increase our understanding of marbling on beef flavour development. The data will also allow for some generalisations to be made about subtler flavour differences due to breed and feed effects. This project is nearing completion with final reporting expected by the end of 2013.

Predicting colour and flavour stabilities of meat from pre-slaughter assessments (A.MQA.0006)

This project investigated the use of blood and urine isoprostanes as a biomarker to predict the colour and flavour stabilities of lamb meat through on-farm assessment. The objectives of the study are to determine the relationship between isoprostane in blood at 2 days to 6 weeks pre-slaughter, the level of vitamin E in muscle at the time of slaughter, determine how this relationship differs between flocks with different finishing diets and to determine how these effects are reflected in colour stability and lipid oxidation measures during retail display.

The feeding trial is utilising young lambs of mixed gender allocated to 4 pasture based finishing diets in order to get a spread of values in the variables of interest (isoprostanes, vitamin E, TBARS and meat colour). This project is currently underway, with final data analysis and reporting expected mid- 2014.

Improving beef colour (A.MIS.1002)

Meat colour has important implications for consumer acceptability and eating quality, with dark cutting carcasses incurring economic penalties, thus negatively impacting the meat industry. This study aimed to investigate the effect that meat colour has on grading 20 week shelf-life chilled vacuum packed beef strip loins. Data analysis showed colour stability to decline with storage week, with week 2, 12 and 20 generating steaks suitable for the consumer at days 6, 4 and 3 of retail display respectively.

With regards to biochemical analysis, with storage, all colour groups were lighter and less red. There were also noted impacts on Purge, Glucosyl units and lactate values. For all colour groups, lipid oxidation increased with day of retail display, however no difference in lipid oxidation was observed between colour groups, but it did increase with storage time. No appearance of significant volatile compounds was observed.

This project is now complete and the report is available upon request.

Ultrasonics to improve beef texture (A.MIS.1003)

Ultrasound applied to pre-rigor meat is postulated to transiently affect membranes, releasing proteases (cathepsins) and calcium (activator of calpains), thus influencing metabolism as well as proteolytic activity. The acceleration of metabolism pre-rigor could potentially be used, particularly alongside hot-boning, to improve meat colour at grading and to enhance tenderness through proteolysis and reduced cold-toughening. The application of ultrasound to post-rigor meat has the potential to alter muscle structure by physical disruption of the muscle tissue, hence improving tenderness. This proof of concept study was conducted to demonstrate whether ultrasound can be used to accelerate post-mortem tenderisation and control rigor mortis onset, thus enabling delivery of a consistent quality product to the consumer.

This project determined that although the application of low frequency ultrasound had no effect on the texture of post-rigor beef muscle, it did influence the colour of the muscle and the application of high frequency ultrasound to pre-rigor beef muscle and the potential modification of metabolism are aspects that warrant further investigation.

This project is now complete and the report is available upon request.

Growing demand for red meat products in the Australian community

In the MLA program, growing demand for red meat products in the Australian community, the AMPC funds channelled through MLA during 2012/13 were primarily focused on nutrition research (\$320k) and nutrition issues management (\$36k). The key outcomes of these investments included:

1. Research program:
 - Funding of 10 new and 4 ongoing research projects on the role of red meat in key life stages (babies; young women; and aging) as well as its role in cancer risk and sustainable diets.
 - Communication of research findings (from completed research) in 33 peer-reviewed publications; 5 Public Relation (PR) activities; and submissions to the NHMRC during the revision of the *Dietary Guidelines* and the *Infant Feeding Guidelines*.
2. Nutrition Issues management:
 - PR focusing on study diets and back to school; Masterclass for media; and symposium hosted by partner, Dieticians Association of Australia, contributed to achieving balanced media coverage (>70% positive and neutral media).
3. Health Care Professionals campaign:
 - Launched the Live Well Plan – a higher protein (red meat) low GI weight loss diet
 - Disseminated to more than 10,000 Health Care professionals including GPs, practice nurses and dieticians.

Further information is available from www.mla.com.au.

OUTCOME 3

Product integrity, safety and wholesomeness

► HIGHLIGHTS

As competition in meat markets increases and trade barriers around expectations for integrity and quality continue to proliferate, the demonstration of product integrity standards has become increasingly important. Food safety is a key component for product integrity, and a standard expectation of all consumers regardless of market. The importance of being able to validate, demonstrate, communicate and manage responses to food safety issues as they arise is part of daily business in the red meat processing industry.

It is important that the food safety system is delivering the appropriate level of protection to the market and that level of protection is continually reviewed against public health data. Linked to food safety is the overall product integrity framework by which Australian meat processing products are produced, including traceability, freedom from biosecurity and disease threats, animal health and welfare measures and overall meat processing quality standards.

In particular, freedom from major diseases underpins Australia's access to the world's premium meat markets and our ability to quickly and effectively quarantine and manage any disease incursions can significantly reduce the costs associated with such an incident in terms of eradication expenses, lost market access and damaged reputation. Provision of a response capability to manage unforeseen food safety and integrity issues is also a necessity therefore the meat processing industry will provide further consideration to investment into building capability and capacity in microbiology, epidemiology, veterinary and meat science disciplines within the future planned research programs.

There is a clear need to move away from the current focus on practice and process to more of a focus on the required and agreed outcome and how this is validated by processing companies and Government and subsequently communicated to trading partners. From a research perspective, there is an ongoing need for investment into the establishment of scientifically valid assessment tools for food safety, laboratory diagnostics and testing and the establishment of verification systems that communicate the required measures and outcomes in a meaningful way to the customer, end user, regulator and community. A further goal is to refine agreed measures and outcomes within these systems to minimise additional burdens of food safety monitoring imposed by governments and trade customers and to further enhance the industries reputation.

This strategic imperative is underpinned by the following key focus areas:

- Research and development towards food safety to ensure food safety systems and practices are the landmark of Australian product maintain and enhance efficient food safety and product integrity standards;
- Maintain and enhance efficient product integrity standards and quality assurance systems;
- Maintain and enhance world class traceability systems;
- Biosecurity, residue management and animal health standards are underpinned by sound science;
- High standards of animal welfare standards are demonstrated.



Greening of vacuum packed lamb (A.MQA.0003)

This project sought to determine the incidence of high-pH lamb in 2 boning rooms and investigate the influence of meat pH and packaging film on greening during long-term storage of lamb loins to help establish the pH cut-off for lamb destined for export/long-term storage. These studies were carried out in 3 sites of varying economic value of the carcase in 2 processing plants accounting for seasonal variation.

Nine carcasses of each pH range were selected at each plant with pH measured and recorded in *Longissimus Dorsi* (LD) muscle as either; Normal (≤ 5.7), Intermediate (5.71 – 5.99), or High (≥ 6.0). These were then boned in groups, one knuckle, one rack (frenched, cap on) and one boneless shoulder were removed from each carcase, then labelled, vacuum packed and cartoned. Temperature loggers were placed into the cartons and they were then chilled and transported to the laboratory for further analysis by commercial refrigerated transport. The total of 162 cuts were then stored in a chiller operating at -1°C for up to 12 weeks and the temperature recorded for each carton.

Commencing at week 4, each cut was inspected at weekly intervals under good light conditions for evidence of greening, weep and muscle colour at muscle surface. After storage periods of 6, 9 and 12 weeks, 3 packs of each cut from both plants were selected on a pre-determined random basis for assessment, scoring the appearance prior to opening, the odour intensity on opening, measuring the pH, measuring the meat colour after blooming for at least 30 minutes and sampling for microbiological quality measures (at 6 and 12 weeks) including TVC and LAB. This data showed vacuum-

packaged lamb to have a shelf life of between 9 and 12 weeks with no greening occurring in the packs when stored at -1°C . There appeared to be little difference in the rate of spoilage as assessed by aroma on opening and microbial numbers between lamb cuts of different pH ranges, however further investigation is required to fully evaluate interactions.

Effect of testing regimes on *E. coli* O157 isolation (A.MIS.1005)

Meat destined for export to the US and other countries must be tested and deemed free of *E. coli* O157 prior to being released into commerce. The current approach for testing for *E. coli* O157 in meat relies on first performing a screening test on an enrichment broth which contains a mixture of bacteria.

This study set out to identify key parameters relating to the testing of Australian manufacturing beef for *E. coli* O157 and trials were conducted to determine if these parameters could negatively affect the likelihood of isolating *E. coli* O157 from potential positive broths at 2 storage temperatures.

The results of the study indicate that the isolation of *E. coli* O157 from a potential positive enrichment broth stored at 4°C or 10°C is not significantly affected by the type of enrichment broth used, the concentration of background microflora in the sample, the time for which the sample is enriched, or the storage of the enrichment broth for up to 7 days.

Enhancement of meat quality by pulsed electric field application (A.MQA.0005)

This project investigated the use of pulsed electric field (PEF) as a tool to enhance meat quality. PEF is an emerging technology that can manipulate the structure of cells and cause the formation of electroporation in cell walls, leading to the release of cellular materials into the extracellular surroundings. 3 different muscles were sampled and used to determine the optimum processing parameters for each muscle. The effect of muscle pH and the muscle fibre direction on the optimised PEF treatment was also investigated to determine the processing applicability of this technology in producing quality product consistent in tenderness.

The effect of repeat PEF treatment on the quality of beef loins and topsides (1 day post-mortem) were investigated. The effect of the meat's pH and fibre direction on the quality of PEF treated beef loins was also studied. Parameters of purge loss, cooking loss, meat tenderness (shear force) and the colour and lipid stabilities were measured with the tenderness of the loin samples found to benefit from repeated PEF treatment. The purge loss of the topsides was significantly increased by PEF regardless of the number of repetitions. Higher cooking loss (%) was found in PEF treated loins but not the topsides. The redness of the loins and topsides decreased and the hue angle was increased by increasing the PEF repeat treatment. No effect for pH and fibre direction on PEF was found. This data indicates a promising potential to tenderize meat using pulsed electric field treatment with further investigation between: *longissimus et lumborum* (LL) and *semimembranosus* (SM) muscles warranted. Observations of negative impact on the colour stability of meat will also be further evaluated.



Cattle washing extension guide (A.MIN.0125)

This project aims to develop an operator's guide to pre-slaughter cattle cleaning/washing. This guide will provide managers with a resource that documents the best practices associated with cattle washing and the science behind these practices.

Cattle washing prior to slaughter is an accepted practice at most major plants in Australia. The principle purposes of pre slaughter cattle washing are the: reduction of physical contamination on hides; and reduced microbiological contamination particularly pathogens on hides. However, little is known around the efficacy of cattle washing in: reducing physical and microbiological contamination; animal welfare issues including: stress; hypothermia; slips and falls; and the use of high pressure hoses; environmental issues associated with the use of significant amounts of water for cattle washing; and the cost of reprocessing the water and meat quality issues associated with the stress caused by the cattle washing process.

Stage 1 of the project emphasised that cattle washing is a well-established procedure in the Australian meat processing industry, confirmed the lack of available scientific literature available in the area, and it confirmed that cattle washing is regarded by the industry as an intervention step for processing plants to reduce the risk of microbial and physical contamination from hide to carcass.

Conclusions derived from stage one clearly supports the use of some type of cattle washing as an intervention step as the limited scientific literature available has established a link between hide micro biological contamination and carcass contamination. It also identifies the lack of any scientific or industry information sheets that give guidance to industry as how to achieve the most effective outcome in terms of cattle washing for carcass hygiene. Stage 2 of this project aims to address this gap by developing a guide for industry use and an accompanying e-learning webinar resource by early 2014. Given the wide variation exhibited in industry practice, resource use, labour, technology, application and processes to produce product to hygiene standards, further research is required into water source, climatic conditions, livestock source (feedlot and pasture), impact of various washing technologies and eventual hide cleanliness and microbiological outcomes for product quality.

Achieving national consistency and regulatory compliance in the use and application of NLIS (A.MIN.0122)

The National Livestock Identification System (NLIS) is Australia's system for identifying and tracking livestock for animal health, food safety, biosecurity, market access and industry-related purposes. To date, NLIS has implemented schemes into the cattle, sheep and goat industries. Units of competency, training and assessment materials have previously been developed to support cattle NLIS using Radio Frequency Identifications (RFIDs), and mob-based NLIS for sheep.

The project included the development of e-learning materials, Train-the Trainer workshops and trial workshops to test and showcase the materials. There remains a need to both create

awareness of the importance of the training programs and to fully implement the training throughout Australia. This also presents an opportunity to measure the impact of the training by comparing and assessing the natures and quality of data received at the central NLIS database.

Training has now been delivered face to face in a classroom setting. Attendees were given training notes from the 15 NLIS units of competency developed in the project A.PAB.0001, as well as copies of NLIS Work Instructions and standard operating procedure (SOPs). In addition to the formal training component of the project, one of the training sessions was filmed, and has been used to create an e-learning resource webinar for use by AMPC member processors, available through the AMPC website.

STEC webinar for red meat processors (2013/5005)

Recently, the US Food Safety and Inspection Service (FSIS) established new rules relating to certain Shiga toxin producing *Escherichia coli* (STECs). These rules require the application of process control and, hazard analysis and critical control points (HACCP) and testing to manage risks. Processors in the US are applying a range of different interventions to manage the associated risks as well as a range of quality assurance and testing responses to comply with the new requirements.

In Australia, there is a need to increase the understanding of the options available to enable processors to comply with this ruling and how to respond to positive and confirmed positive results for STECs. Increased certainty over the implications of STEC detection in the US will lead to continuation of supply chains for Australian shipments of grinding meat to the US. This project provided an e-learning based interactive webinar that included:

- › How US processors and customers are dealing with and addressing the new regulations, with specific focus on HACCP, EIACCP review and revised processes
- › What interventions are being applied by processors in the US, particularly what new interventions have been established
- › What might be applicable to Australian processing companies, notwithstanding the recognition of commercial decision making for any specific uptake,
- › What emerging issues are likely to have an impact on STEC decisions; New and updated advice will be given to the whole industry on interventions and management approaches to STEC being taken in the USA and other markets that may be of value in the Australian context.

This webinar developed in early 2013 will be available for use by AMPC member processors by the end of the year.

Maintaining and enhancing the NLIS database

Managed by a subsidiary of MLA, NLIS Ltd, and supported by AMPC, the NLIS database is the technology platform that underpins the national system of livestock traceability from property of birth to slaughter – an essential element that enables food safety claims in overseas markets.

During 2012/13 an average of 273,970 transactions were processed through the NLIS database each month, a decrease

of 12% from 2011/12 driven by a decrease in data queries. The number of account holders grew by 8% to over 60,000. Also in 2012-13, MLA conducted the biennial audit that ensures the database is being managed effectively and can support compliance with the national traceability performance standards. A number of database improvements were also made during the year, including the development of a data warehouse and business intelligence reporting capability, and improvements to email notifications.

SAFEMEAT

SAFEMEAT is the food safety partnership between the red meat industry and Government, with a primary role of overseeing and promoting sound management systems in the red meat industry to ensure the delivery of safe and hygienic products. SAFEMEAT is supported by all sectors of the red meat and livestock industry.

An important activity during 2012/13 was SAFEMEAT Initiatives Review, established to recommend a road-map for the sustainable delivery of industry's on-farm risk management systems to support emerging and future requirements. SAFEMEAT Partners endorsed the vision and key principles for future SAFEMEAT initiatives in November 2012 and the SAFEMEAT Initiatives Review Working Group continue to progress the development of recommendations and an implementation plan.

Livestock production assurance

Overseen by an industry advisory committee and administered by AUS-MEAT Ltd, Livestock Production Assurance (LPA) is the cattle and sheep industry's on-farm food safety program. The program had more than 202,000 accredited participants in June 2013, an increase of 3.3% from the previous year. During 2012/13 MLA and AMPC assisted industry to further the introduction of a web-based system for producers to manage their National Vendor Declarations (NVDs). Improvements were made to the accessibility of the electronic declarations system. Furthermore, a pilot occurred of technology to allow producers to enter their NVD information directly into a central database. Use of the electronic NVDs increased 47% during the year, with an additional 4,029 producers signed up to the system.

Food safety research program

An important component of industry's food safety program is conducting research based on sound science, risk assessment and new management strategies. Research initiatives involve:

- › Consultation with stakeholders on the strategy, direction and themes for the program to ensure it meets market requirements;
- › Scientific discovery and knowledge generation to find new ways of managing food safety hazards along the supply chain;
- › Using scientific knowledge to facilitate change and further developments within the industry by communicating and collaborating with stakeholders.



MLA food safety research, co-funded by AMPC, focuses on communicating knowledge about food safety risks in the red meat supply chain, and their control, so that industry, regulators and the marketplace worldwide are satisfied that risks are being managed effectively. The communications components ensure that the high level of food safety of Australian meat is acknowledged. The industry's food safety reputation has been strengthened by the publication of many scientific papers and presentations given to regulators, food industry and food safety conferences in Australia, USA, China, UAE, Saudi Arabia, Jordan and Egypt.

Key activities undertaken during 2012/2013 included:

- Scientific research was undertaken on the safety of Australian red meat, particularly on pathogenic E. coli which is relevant to manufacturing beef;
- An evaluation commenced on antimicrobial resistance in bacteria that may transfer from animals to product during the slaughter process – in order to provide contemporary data on this emerging issues;
- Consultations occurred on changes to the Food Standards Code that would promote implementation of effective control of listeria in processed meats;
- Shelf-life research continued and validation of long shelf-life for vacuum packed lamb was published in a scientific journal;
- Investigations of cancer and beef measles in post-mortem inspection continued;
- Regular reporting was made to processors on the hygienic quality of product compared with national results and trends;
- Processors were trained in investigation and documentation of hygiene control of the slaughter, dressing, and packing process;
- A guide to product safety at retail was published and promoted through industry conferences and publications;
- Numerous presentations were delivered to overseas government officials, importers, and end-users about the quality and safety issues including traceability, shelf-life, E. coli, Hormone Growth Promotents (HGP) and chemical residues, maintaining customer confidence.

OUTCOME 4

Improving meat processing productivity, products and processes

► HIGHLIGHTS

Productivity growth and the ability to respond quickly to changing economic conditions are essential to maintaining industry competitiveness. Research and development, coupled with innovation and capability is recognised across industry as crucial to underpinning productivity gains. In particular, developing and implementing new products, processes and innovative technology solutions are required for business productivity and sustainability.

Processors operate complex businesses in an environment characterised by highly variable seasons and markets. It is essential that research and development delivers new tools, manufacturing practices and technologies that support red meat processing businesses to become more productive and efficient. New and emerging challenges include labour and skills shortage, competition brought by emerging international technologies, climate challenges including drought, increasing regulatory pressures, the decline in RD&E expenditure, slower technology outputs and slower rates of adoption all impact the rate of productivity growth in the industry. Consequently, new technologies, processes and practices that enhance efficiency and profitability are becoming increasingly important for all processing businesses. There are opportunities to address these issues through research and development applied at an industry-wide level.

In terms of new product development, the alignment of innovation with the needs of customers and trading partners will be imperative. This requires detailed understanding

of the specific markets to be targeted and subsequently, the technological development opportunities for product development for these target markets.

This strategic imperative is underpinned by the following key focus areas:

- › Increasing the productivity of red meat processors to compete on the global scene through new technologies and manufacturing practices;
- › Examining novel and efficient technologies and processes for whole carcass measurement and monitoring;
- › Developing new meat products;
- › Examine opportunities to value add from meat and meat products;
- › Enhance the adoption and commercialisation of new technologies and innovations in industry.



Picking and packing review (A.TEC.0093) and Picking and packing design concepts (A.TEC0107, 0109, 0117, 0108)

Australian red meat processing facilities are increasingly experiencing logistical congestion in their sorting, packing and cold storage areas creating both an increased requirement for labour, operational constraints and posing potential Workplace Health & Safety (WHS) risks to employees.

A picking and packing review was established to identify materials handling challenges and opportunities for (“picking and packing”) of carcasses, post boned & sliced product. The review benchmarked and quantified areas of industry need (for beef, sheep, goat and lamb) in relation to picking, packing and materials handling, the technological opportunities relevant to these needs and the likely developmental challenges. An analysis of cost, benefit and possible technological or provider gaps was carried out, noting that the main difference in terms of challenges faced and recommendations will relate to factors such as the size of cuts, product ranges, plant configurations and engineering and product specification.

Outcomes of the review included the identification of a priority list of tasks, detailed analysis of solutions that processors require (or are seeking to adopt/adapt) and identification of existing commercial technologies including in other manufacturing other industries. The review has provided the ability to strategically analyse and benchmark the areas of industry need, identify the technological opportunities relevant to these needs and quantify the likely developmental challenges and an analysis of the relative cost benefit of different approaches.

A further suite of 4 projects was established with major technology providers concurrent to the review to examine specific engineering concepts that could address identified materials handling challenges. Each provider was tasked to work with a partner meat processing plant to select a specific materials handling challenge and to design a concept that would enhance the practice at that site and for other processors facing similar issues.

These concept designs will result in integrating or developing systems that can automate identified product sortation and packing tasks such as primal cut identification, collection and packing into specific product carton. The next phase of this work will focus on engineering selected solutions for commercial trials and analysis of cost benefit and feasibility for wider uptake by industry.

Bandsaw benchmarking project (A.TEC.0098)

This project is aimed at benchmarking bandsaw use across lamb and beef processing tasks to identify short, medium and long term solutions for industry to manage, improve or replace bandsaw use. There is a need to quantify band saw use across industry and to understand where specific changes could be made and/or communicated to industry. As part of this project, data comparing the various available solutions has been gathered, not only in relation to WHS, but in terms of yield and processing efficiency. As part of this project, options to further engineer or extend information to industry has also been identified.

The benchmarking has involved measuring the bandsaw applications for small stock carcasses and beef carcasses and

quantifying differences in use, handling, yield, WHS risk. An industry working group of about 15 processors provided specific input to the identification and assessment of available options, as well as possibilities for both engineering and extension of industry information.

Review of manual assist technology developments and solutions (3000/5085)

This project will involve the identification of individual tasks (e.g. by benchmarking FTEs, skills, task requirements, labour, WHS risk) and the opportunities, challenges and implications for manual assist technologies (both those that have been developed and future innovations). The project, which is currently underway, will centre on the development of an industry strategy in this area, informed by task quantification and dialogue around current technologies as well as future possible solutions that would address the challenges faced. The project will seek to produce a manual assist review, accompanied by recommendations around a strategy for the future.

Chilled meat carton load out solution development through automation (A.TEC.0102)

The majority of Australian meat is exported in cartons and packed in refrigerated shipping containers. This shipping method involves a number of challenges such as WHS and damage to product, as well as inventory management and traceability. To date, some semi-automated or load assistance devices exist for container packing of frozen cartons. However for the majority of Australian processing and logistical systems, there is a need to develop alternative solutions, particularly where meat cartons are packed in containers for shipping for export purposes.

AMPC also recognised in consultation with industry, that different practical challenges exist for chilled vs frozen product, in relation to packing and load out. Therefore this project was designed to examine chilled product initially given that there is a greater degree of standardisation of this product compared with frozen products that can change shape.

This project seeks to develop an automated container loading solution for chilled cartons as a proof of concept trial and to demonstrate the effectiveness of the solution as a case study.

Challenges being considered as the project continues include identifying a suitable concept to produce an automated container loading system that has the capability to meet all requirements including a satisfactory cycle time and full traceability. The project initially examined the use of Automated Guided Vehicles (AGVs) however these were found to not fully meet the requirements required of avoiding carton damage, traversing uneven ground and managing the degree of operational space within the containers. The solution under investigation is now based on a customised automated handling platform to address the specific requirements of loading chilled meat cartons into containers.

Cartons will be conveyed via a traversable conveyor fixed to a customised robot delivery system, barcodes on cartons will be scanned for traceability and load confirmation. Cartons will be 3D profiled to detect carton bulge and will be unloaded from the conveyor via a robot and stacked into containers in

the required stacking pattern. The robot and conveyor system will traverse in and out of container as required and the cycle repeated until the container is full.

Finally, the system will be reviewed in context of related material handling and inventory management requirements and activities across different processing plants, where variations in order to effectively integrate the resultant solution will occur in relation to activities including palletising, de-palletising, mixed pallet sortation, mixed pallet order picking and container loading.

Novel semi-automatic tool for spinal cord removal from ovine (A.TEC.0099)

High quality ovine production, in particular lamb for the Australian domestic market requires the primal and sub primal pieces to be free of high risk tissues such as spinal cord. In many plants after the breakup of lamb, the loin, rack and square cut shoulder primal pieces are trimmed to meet customer specification. Separating and disposing of the spinal cord is highly labour intensive.

The purpose of this project is to develop a semi –automatic tool for the removal of ovine spinal cord using a vacuum system to suck the cord out from the spinal column prior to chilling whilst the carcass is hot and just before the end of the slaughter line after final veterinary inspection.

The concept for the tool design is intended to allow for simple manufacturing and easy handling by an operator. Trials have been successfully completed to assess variability in ovine carcasses and demonstrate a semi-automatic tool. This tool can be used initially as a hand tool to insert a vacuum tube through the neck into the spinal cavity of a hot lamb carcass for efficient removal of the spinal cord. The report will present the analysis of the use of this tool and its potential for adaptation to a robot tool. It will include cost benefit analysis of its use, both as a hand tool and for use with a robot for automatic operation.

Tests have provided information for this design to be licensed to a manufacturer and for the unit to be professionally produced for final trials. A cost benefit analysis will confirm, based on boning room labour savings of 10%-15% and the increased efficiency for 6 – 8 people. Once the project is completed in the near future, the approach for the design of the tool will be considered for the use on other animals such as cows.

A review of objective carcass measurement and comparative analysis of sensing and scanning technology with processing data needs (A.TEC.0094)

Processors are required to continually respond to customer orders, often in real time by allocating animals (and specific cuts from specific animals) to required markets. However, most processors are limited in this ability through lack of technological solutions for data capture, specifically Objective Carcass Measurement (OCM). Identifying sensing technologies that are able to improve current processing and/or provide a platform for automation is a key focus for automation R&D suppliers and the industry as a whole.

Computed tomography (CT) has the potential to become the ultimate OCM tool to automate not only physical tasks, but

also decision making in terms of boning methods and product-customer allocation, as well as more effectively reward firms. Investigations into automation have previously taken place, however these investigations have lacked a strategic outlook.

It is important to identify a platform of sensing and scanning technologies that have the ability to capture yield and carcass data, whilst being capable of transferring information to robotic operating components and other automated functions. As technology implementation advances, there will be a need for multiple technology devices and machines to communicate with each other. The key objective behind this project is to focus on enabling technologies such that data capture addressing processor yield information needs can be further developed for efficiencies.

Over the past few years AMPC/MLA, on behalf of industry, have considered the potential of using various objective measurement technologies for the purposes briefly outlined above. CT has been promising in relation to both OCM and sensing and scanning for automation on the basis that it appears it can provide:

- Sensing for bone location and optimal cutting lines, allowing automation of manual tasks;
- Detection and measurement of pathology defects;
- Direct measurement of muscle and fat content to tailor value maximising further processes;
- Objective carcass grading for unbiased feedback for suppliers on which premiums could be based and better breeds developed.

This project sought to review the available automation technologies and conduct a comparative analysis between these (and in particular, their sensing and scanning components) with the various data requirements and specifications for processing categories of product at the plant. The main objective is to determine which sensing and scanning approaches provide not only the ability to guide

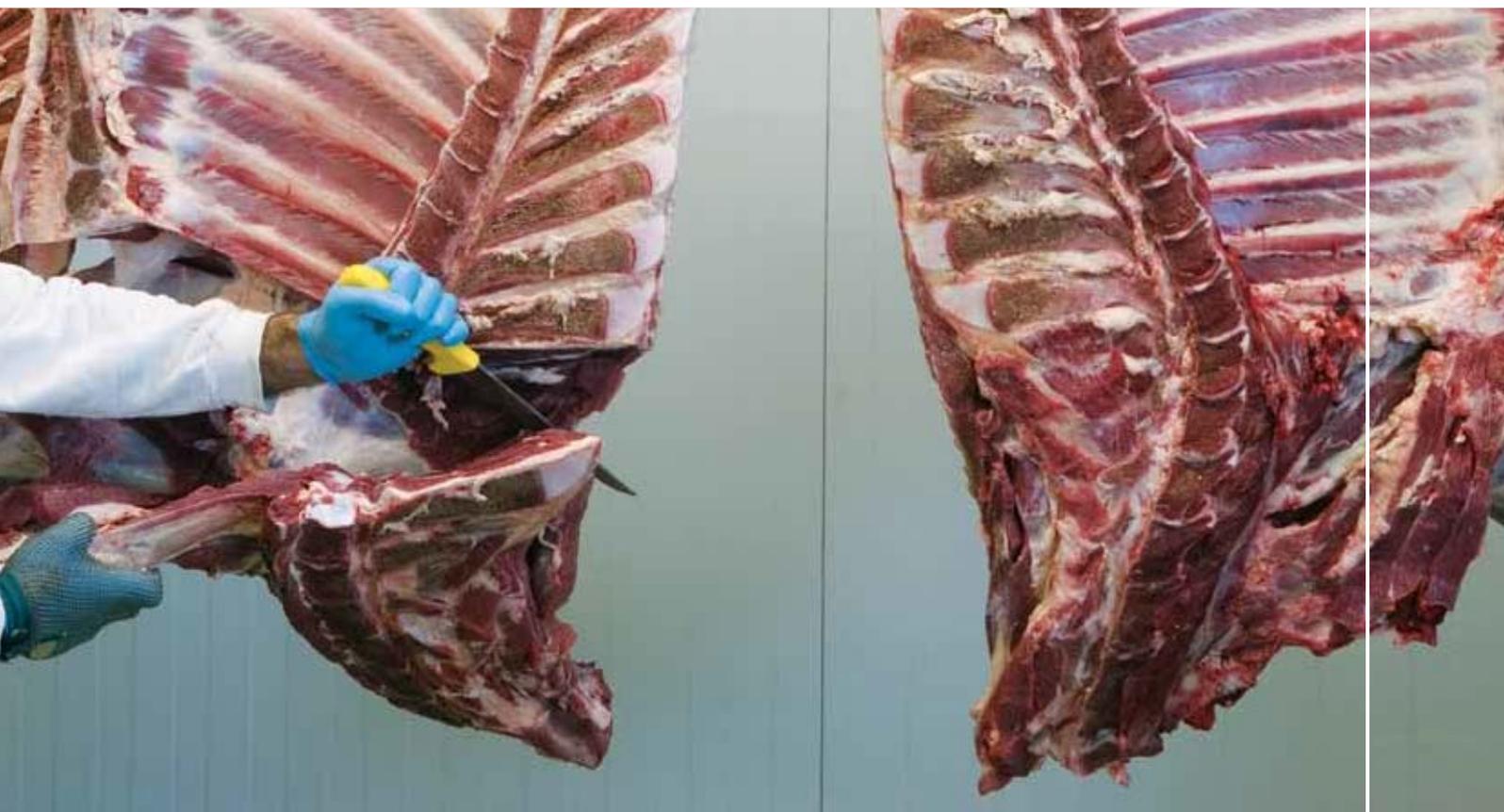
automation and robotics technology, but that can collect data on the carcass that addresses the information needs of processors, such as quality, product integrity, colour, cutting lines and so forth. This project sought to review and summarise the current approaches to OCM, sensing and scanning and the various technologies that employ both, and then identify future RD&E gaps, needs and priorities for consolidating investment into new technologies into the future. Finally, the main outcome will include setting up a baseline analysis for purposes of building an industry strategy in this area that can guide investment across new technology development in combination with OCM for data capture and that accounts for changing customer needs and the various cost benefit analysis brought by different configurations for meat processing and business systems/operations.

The project is currently establishing a project committee for technical input (e.g. where industry representatives will advise and review the review material in relation to processor data needs for yield and OCM) and may involve surveying several RD&E providers. The key focus is to quantify the type of sensing and scanning that industry should focus on in relation to future automation and robotics investments.

Determination of intramuscular fat in lamb at an individual muscle and whole carcass level using computer aided tomography scanning (A.TEC.0096)

The aim of this project was to establish whether CT scanning can be used to determine IMF in lamb meat. This project complements existing Sheep CRC projects where lamb carcasses from the Information Nucleus Flock (INF) are subjected to CT scanning for whole body composition analysis. CT scanning technology will be used to determine whether this relationship is consistent within a range of muscles within the carcass, determine how consistently IMF is distributed throughout other muscles of the carcass and determine whether this distribution is influenced by carcass Australian Sheep Breeding Values (ASBV's).





Half carcasses were obtained from approximately 400 lambs as part of the Sheep CRC INF that were divergent across a range in IMF ASBV's. Carcasses were split into hind quarter, saddle, and forequarter sections and scanned. Following this, specific muscles from each section were excised for IMF determination via Near Infrared Spectroscopy (NIR) and a subset analysed further via chemical (soxhlet) extraction. Statistical analysis of this data will determine the association between IMF% and CT image characteristics with correlation coefficients for IMF% between muscles determined.

This project is underway and will conclude in late 2013.

Electrical stimulation analysis (sheep CRC)

Recent studies have looked into the positive impacts of using electrical stimulation (E-stim) on lambs. E-stim enhances quality of meat by improving tenderness and meat colour parameters. The application of an electrical current through a medium voltage system is an effective way of controlling the rate of pH decline of carcasses post-slaughter. Furthermore, because the rate of pH and temperature decline of a carcass can significantly affect meat eating quality, Sheep CRC research has shown the percentage of carcasses achieving pH targets of 6 under stimulation between 18–35°C when compared to no stimulation increased markedly to 90% from a baseline 14% re-enforcing the added benefit the process of E-Stim can apply in the meat processing industry. AMPC has been working with the Sheep industry CRC since 2006 investing in the 3 'Next Generation Meat Quality' program. Now in its 7th year, this program is designed to increase the rate of improvement of lean meat yield (LMY) and meat quality through delivery of

genetic and non-genetic tools. Further work is now underway in a related project funded by AMPC to develop training material and an accompanying pilot course for purposes of enhancing industry capability to measure the effectiveness of electrical stimulation and therefore make the necessary mechanical adjustments to ensure consistent and quality product to specifications. Further information on this project is available from the AMPC office or via www.ampc.com.au and will be presented via the AMPC funded MINTRAC networks operating in each state in late 2013 and early 2014.

Quantifying the benefits of developing a CT marbling solution (A.TEC.0100)

The objectives of the project were to determine if differences existed in the estimate of kilograms of total fat from CT scanning images at a range of temperatures. It was determined that a difference in the estimation of fat in primal cuts at different temperatures using CT scanning does exist. This study found a 32% difference between estimating fat in a primal cut at 2 and 35 °C. It was identified that this could be modelled through a regression analysis. It was also identified further study with additional data points would strengthen this relationship and be a useful tool that the meat industry could use to estimate intramuscular fat percentage in primals at different temperatures.

Further, the project sought to determine the relationship between the Meat Standards Australia (MSA) marbling score, chemical IMF (%), and the CT scanning image of IMF (%) of the 10 mm slices. In order to examine this, 10 grass and 10 grain finished Angus striploin primals were used in this study. All

striploins were CT scanned, denuded and scanned again. Each striploin was cut into 20mm steaks, labelled and photographed for MSA grading. The denuded CT scanned images were analysed to determine the percentage of IMF in each of the 20 mm steak slices (~13 steaks/primal) across all 20 striploins. The CT scanned results of individual slices of IMF are reported and this analysis remains underway to determine the relationship between MSA marbling score and IMF utilising CT scanning.

The next step was to develop an equation to estimate IMF (%) in primal cuts. The objective was to use information from individual slices to develop an equation to estimate the total amount of IMF in 1 primal cut. The Beef CRC IMF (%) results of individual slices of a striploin primal were reported as background to the project. From this, an equation using stepwise regression was developed.

This investigation will be described in a published report available later this year. The final phase of the project involved performing an economic cost benefits analysis to determine the profitability of implementing a CT scanning technology into an abattoir. Detailed costs of placing CT scanning equipment into the supply chain were collected. This data was then examined and analysed by a senior economist in order to fully evaluate the cost benefit. The report will be available from AMPC office or via www.ampc.com.au by the end of the year.

Extension of meat lumping best practice guidelines (A.TEC.0103)

This project was developed to review meat lumping practices across industry and to determine current and best practices. The project provided a review of literature, injury data and ergonomics of meat lumping practices to underpin

development of and industry best practice guide which included a checklist, background on alternatives and advice on the design and implementation of commercially available options and solutions. Outputs of this project have confirmed a range of commercial best practice options currently available to industry to mitigate injury risks associated with the task of meat lumping.

The study established that there are a wide range of meat lumping practices operating and therefore this is an opportunity to standardise some of these practices within the industry in order to demonstrate to stakeholders that the respective WHS issues are being widely addressed.

This project is ongoing with industry working groups currently commenting on the guide and the development of a comprehensive extension/dissemination strategy to promote available options and alternatives to industry and to re focus industry on meat lumping practices. Further WHS information is being extended to industry via the recently developed supervisor site at MINTRAC.

A predictive model (and tool design) for firm level cost benefit assessment of the purchase and implementation of new processing technologies (2013/1028)

There is a wide range of technologies, processes and practices already implemented in the red meat processing industry aimed at improving productivity and efficiency. Furthermore, new developments in this field are continually evolving. AMPC in consultation with industry determined that there is a need for a model which incorporates all costs and benefits associated with these activities.



This will provide the red meat processing industry, at the plant level, a decision making tool on future investments. The model will not only include direct costs and benefits such as capital investment, savings in energy and labour costs and increased output but it will also need to incorporate potential savings associated with staff retention and associated training costs, WHS issues, quality assurance practices and overall productivity. It is intended that the model will include the ability to calculate net present value, internal rate of return and payback period, enabling the red meat processor to not only assess the potential returns from a specific project but also compare and rank alternative investment options.

The project is currently underway and is anticipated to be reported shortly. It will document the range of technologies, processes and practices available to the red meat processing sector commercially, assess the costs and benefits associated with implementation of each technology, using data from the industry (business inputs and outputs) and develop a checklist of costs and benefits for inclusion in developing the predictive model for future technologies. Information relating to assumptions and implications for developing a new model will be included. Documentation for processors to facilitate use and interpretation of the model within their own business structures will also be provided to industry.

Technology and engineering training for meat processors – a resource kit for processing engineers (new technologies and their adoption on plant) (A.TEC.0119)

Numerous red meat processors in Australia have developed and integrated a wide range of processing, slaughter and automation technologies including specialist machinery and robotics. The integration of these technologies presents many challenges, some of which are often unforeseen prior to the decision of implementing a new technology within the processing plant. Whilst many technology providers already publish guidelines on their specific engineering solutions that accompany their ongoing service support for industry, AMPC considered that some fundamental training that dealt with the challenges in implementing new technologies and managing the impacts to processing operations was required for industry in the longer term.

These challenges generally include impacts on engineering, maintenance, production/processing interferences, lost productivity and down time, changes to product quality and specifications, food safety issues and general operational problems. In addition, there are often challenges with training staff to operate the technology, impacts on other staff along the processing chain, impacts on supervisors and Quality Assurance (QA) personnel in managing their responsibility to check and validate the effectiveness of processing and changes in cultural attitude and learning's required for staff.

This project is aimed at developing a resource kit to underpin relevant (or new) engineering and maintenance related units in the *MTM11 Australian Meat Industry Training Package* that are undertaken by engineers, plant supervisors, maintenance or processing personnel. The resource kit is directed at assisting processors that are considering implementing a new technology or automation solution, with the correct



appropriate preparatory considerations and methods to assess, mitigate and address key challenges related to the implementation of new technologies on plant.

This type of resource will include specific tools and information that can be applied in the work environment and allows for flexibility in learning and delivery at different levels, not just Diploma level. A suite of related existing training units within the Meat Industry Training Package have been identified. These units have been reviewed and mapped against the desired outcomes of the resource kit. A list of background resources has also been prepared and technology providers contacted for more information that will add value to the final product. A draft resource kit has been developed and will be made available for industry consultation shortly.

Lamb chining comparison study for 4 technology options (A.TEC.0104)

This project was developed to evaluate and effectively assess and compare 4 alternative equipment solutions for the removal of ovine chine bones in Australia. The removal of lamb chine bones (including the thoracic or rack vertebrae and lumbar or loin vertebrae) is currently manually done, requiring significant band saw work which has implications on product yield, consistency of finished product specification, and WHS risks.



Automated removal of chine bones was identified by industry in conjunction with AMPC as an opportunity to improve efficiency and product value in Australian lamb operations. Chine removal systems in various forms have been tested in the industry in the past, however none have been used successfully on an ongoing basis.

AMPC have funded the research and development of 2 different technologies to automate the chine bone removal process and to address a range of industry needs. In that time, alternative solutions have been developed including 2 systems from New Zealand, and more recent developments in Australia. There are now at least 4 different chine removal technologies available/ being developed in this area, all with different approaches and trade-offs.

Some meat processing companies currently remove chine bones manually which requires a lot of bandsaw work and thus are currently considering which of the range of solutions are best for their particular businesses. At least 6 plants are in various stages of either implementing or considering the purchase of 1 of the above chining options. Finally, there are 10 plants using existing systems that are also seeking to improve their system performance, or considering alternative systems based on the results of this study.

AMPC are seeking to provide general recommendations to industry through the application of a comparative study of the different systems for various small and large Australian plants. Factors being included in the comparative review are yield implications, finished specification, shelf-life, bone dust, WHS implications, throughput differences, capital and installation

costs, foot print required, maintenance and supplier support and operation in a commercial setting (efficiency and feedback from processors). A number of sites have been visited to conduct the analysis across the range of systems. The modelling will include plant specific data and equipment specific data as well as data from other sites (aggregated) to provide a baseline for the model that will assess and compare the operation of various chining machines.

This project has since benchmarked the existing manual method used for chine bone removal in Australia and quantified the value opportunity that exists for automation. Data collected demonstrates significant variation in manual yield results close to \$1.00 per head, even for the same product specification and processing speeds.

The study is currently focussing on conducting yield trials at a range of lamb processors where systems are installed to enable detailed equipment performance comparisons. Results to date indicate that automated solutions across the different carcass specifications and finished product specifications can deliver upwards of \$1.90 per head for the different Australian processors, compared with manual methods. The very best manual performance (slower than commercial speeds) is still less than that observed by the automated solutions reviewed to date. This indicates new capability has been developed beyond the physical limitations of a bandsaw. Finally, this work has determined what RD&E may be required to adapt the equipment to Australian conditions where the system is currently in plant prototype trialling, and has identified the criterion for selecting the best solutions for small plants and for large processing plants.

Spinal cord removal in beef processing – introduction to industry (A.TEC.0088)

As reported in last year's report AMPC, with industry, sought to develop automation strategies which included spinal cord removal on the basis of this being a key function required by many customers and an area where automation and labour inputs could be considered. The benefits to processors of automating the spinal cord removal task are considered to be reducing the requirement for specific labour (at this point on the line), eliminating some of the WHS risks associated with this manual task, improving downstream processing procedures and hygiene and reducing contamination.

This project researched the available manual tools that are used for spinal cord removal identifying that the most commonly used tool in Australia was difficult to adapt effectively to a robot. An alternative high pressure water and vacuum removal tool was developed and commercially trialled successfully proving the concept of the tool. The water and vacuum tool was adapted for mounting on a robot and trials were conducted with positive results. In summary, the trials and concept design for the spinal cord project acknowledged that:

- › Visual absence of spinal cord/duramata would be the key to the acceptance of any new process;
- › Recent trials had shown that the use of high pressure water left the carcass looking cleaner than current practices;
- › Containment and segregation from edible product of the water jet and removed spinal cord/duramata would be a key food safety concern;
- › Negative impacts on shelf life are likely to be negligible given that the carcasses are already exposed to water from other processes particularly where spray chilling is applied;
- › The use of water in removal of bone dust may in fact have a positive effect on product presentation/shelf life.

Trials were expanded to demonstrate the ability to present the side of beef in the correct position every time and meet the required speed of operation.

The trials also highlighted that further work is required in the areas of visioning and sensing, as well as in terms of ensuring alignment with quality assurance provisions (e.g. consider the splash onto the other areas of the carcass, high pressure of the water being forced into the meat through the nerve canals) before the system could be accepted in the processing environment.

It is clear to AMPC that the work required in relation to vision and sensing will be best achieved within the broader industry wide strategy for a range of automated solutions in order to maximise value and return on investment for meat processors.

This broader strategy is underway in the form of a review commissioned by AMPC currently, that is examining sensing and scanning solutions for the existing range of commercially available technologies, as well as those intended to be designed in the near future. The basis is that the same approach could be taken to sensing for a range of automated solutions, thereby reducing the need to duplicate research in part, and enhancing efficiency when seeking to integrate these

solutions with existing information technology and inventory or traceability related systems.

Meat science tutorials

AMPC and the National Meat Industry Training Advisory Council (MINTRAC) facilitated 2 forums for the extension of the latest information pertaining to meat science. Adding to currently available Meat Technology Updates, AMPC fact sheets and published meat science outcomes developed by the Meat Industry Services and other providers nationally, this initiative was aimed at supplementing the information available to meat industry (MI) personnel. Although these materials are readily available, meat industry personnel often do not have the time to research, locate and read the materials and in some cases, the scientific information is highly technical and needs additional explanation.

In identifying and developing the subject material for these tutorials, AMPC worked with MINTRAC to identify issues confronting industry and identify speakers to address these topics at sessions held in conjunction with MI and QA networks. The speakers from The University of New England and Commonwealth Scientific and Industrial Research Organisation (CSIRO) explained these quality issues and their applicability to meat processing in Australia as well as answering the questions from attendees. An electronic resource in the form of a webinar was also developed and is readily available to members through the AMPC website.

High Pressure Processing (HPP) – new product development and meat science mechanisms

HPP is an emerging value adding technology for increasing shelf life and potentially improving eating quality of secondary cuts. There are currently a handful of HPP manufacturing facilities in Australia which can provide the opportunity for meat processors to explore value adding opportunities with little up-front investment. To support such initiatives a project is underway to identify the mechanisms underlying the improved tenderness exhibited by some cuts after HPP.

Studies at CSIRO have shown that for brisket and outside flat muscles, HPP treatment at 4°C partially denatures myosin and totally denatures actin with a resulting reduction in the peak force values (increased tenderness). The muscle fibre lengths and the connective tissue fraction appear not to change. MLA, through AMPC investments, is also working with a value adder to develop HPP red meat products which are due for commercial release this year as the first to market Australian red meat HPP product.

Very Fast Chilling (VFC) – meat science mechanisms

Following earlier observations of the potential for accelerating tenderisation in lamb loins through VFC, a systematic study commenced into the mechanisms behind this phenomenon in order to explore potential novel interventions for manipulating eating quality during processing. In a trial conducted on-site at a beef processor, VFC accelerated tenderisation (reduced shear force) of hot boned beef loin at 2 days of ageing although this difference disappeared at 5 and 14 days of ageing. As there was no change in sarcomere length, this provided an opportunity to explore a novel tenderisation mechanism which



is independent of sarcomere length. VFC also appeared to reduce purge and cooking loss. Work is continuing in this area.

Near Infra Red (NIR) for grading beef and sheep

NIR measurement applied to lamb carcasses at line speed as they exit the kill floor was able to predict, in 85% of cases, whether the carcass would reach the target pH of 5.75 at 24 hours. Providing this information on a carcass by carcass basis allows alternate disposition of out of spec carcasses and thus an overall improvement in average eating quality for lamb.

NIR is also being evaluated as a tool to augment beef grader evaluation of carcasses. The instrument has the potential to provide objective assessments to aid in grading and to facilitate multisite benchmarking.

Enzyme tenderisers

A pilot trial has confirmed that a phosphate free enzyme based tenderiser showed a positive impact on eating quality. The enzyme continued to act during ageing – and eating quality peaked, then declined. Previous work on enzymic tenderisers showed that much of the tenderisation occurs during cooking. Taken together the results suggest that the optimum level of enzymes for tenderising depends on the cooking process (temperature and time) employed. Future work will aim to develop a more robust enzyme system.

Shaped meat – modifications to Smartshape and development of alternative design

The opportunity for processors to add value to certain cuts by improving their plate profile was identified previously and a machine developed, known as SmartShape. Recent work has

focused on increasing productivity of the current SmartShape machine by development of an integrated auto bagger attachment and the new device is currently being assessed.

In response to processor and value adder feedback, an alternative design has been developed which aims to increase throughput. The prototype machine shapes whole muscle meat at faster speeds and has generated good commercial interest to date. The major benefits of shaping are increased yield, consistency of cooking, reproducible plate profile and more attractive sub-primal utilisation. Both shaping options are offering increased throughput, scalability and flexibility.

High Moisture Extrusion Cooked (HMEC) and development

An emerging technology for the transformation of low value trim into textured meat product has been evaluated for its potential in red meat value adding. The technology applies high temperatures and high pressures to melt meat proteins and other ingredients and then form them into a textured product. Concept products have been developed with potential applications identified in food service, snack foods and fast food areas.

Further, HMEC products using red meat may be able to provide platforms for delivery of health food solutions for fortification/enrichment and be an alternative to current vegetable, wheat and soy proteins. Positive early market feedback for HMEC samples was sought from participants earlier this year at the Global Pizza Pasta challenge event and a commercialisation partner has been identified for a pilot scale evaluation of the technology and product options.

Powdered meat – proof of concept

Red meat is under-represented in snack foods and a project is underway to evaluate a technology for the production of powdered meat which could provide the basis for new snack food products.

A number of devices have been evaluated for the conversion of meat into dry powder. The product is being evaluated for microbiological quality and for functionality as a food ingredient.

Early prototypes of HMEC and powdered meat (derived from value adding 80CL Trim, bones etc) have been developed with initial equipment capabilities defined and modelled.

Review of Australian processing industry's offal retention, packaging and market selection

A review was completed of current capabilities within tier 1 and 2 processors to develop new value added offal products for export.

The study provides a baseline for the application of novel science and technology platforms (such as VFC and active packaging) to product development. This project also relates to the industry funded nutritional program for liver fortification and is the first step in developing value added liver options for export.

Primal utilisation program – value add solutions for secondary cuts

A series of workshops were held involving beef, veal, sheepmeat and goat processing partners, value adders and retail operators to showcase alternative cutting lines, cut/cook MSA protocols, plate profiling and applying a combination of science and technology platforms such as Sous Vide, re-heatable packaging and Case Ready packaging to develop new product ideas and value adding capability.

Co-products from blood, cartilage and offal

Blood represents a sizable and underutilized co-product of red meat processing. There are, for example, 18 Litres of blood per head of cattle on average, which contains very high quality and functional proteins. Such functionality is valued in the food and related industries but, across Australia less than 5% of abattoir blood is collected for value adding and most goes to rendering with a net value of only around 2 cents per litre. Whilst there are some well established applications for blood components in pharmaceutical manufacture, the volumes are relatively small and the purity requirements are high.

An aim of the co-products program is to develop new and more accessible applications for blood in food and feed products. As cost of manufacture is more significant in such applications, new processing technologies are also being developed to provide competitive advantage to Australian processor – value adders.

Having collected blood for value adding a key to profitability is extracting multiple products from this unique raw material. A number of initiatives are underway to simultaneously extract higher value blood components such as plasma, bovine serum albumin (BSA) and immunoglobulins (IgG) but in all cases the red blood cells, which account for up to 50% of the blood proteins are discarded and sent to rendering (at the low margin).

One of the limitations of the use of the red blood cell fraction is the intense red black colour and associated flavour, which impacts on use in petfood, stockfeed and aquafeed. At small scale, through industry funding, a process has been demonstrated for removing the colour and extracting the protein from blood cells. Further, novel uses of the colour (haemoglobin) fraction are being explored. Initial calculations on the value of decoloured red blood cell protein suggest a benefit of more than \$3 per head. The next phase is to develop pilot quantities for evaluation of both products by potential customers and to confirm the production costs, value to the customers and net benefit per head.

Potential food applications of blood plasma were assessed, indicating:

- That the plasma protein powders are well suited to emulsification and binding applications in food products;
- That incorporation of plasma powder may be possible without major modification of processing equipment or protocols in some applications.

The powders may allow food manufacturers to produce differentiated food products through the reduction and/or modification of ingredients, at reduced costs and without loss of product functionality. Together with powdered meat under development, new opportunities in meat snacks are anticipated.

Cost effective purification technologies for Australian bioactives

Through CSIRO, 2 novel solvent free processes have been developed, one for BSA extracted from blood plasma and one for chondroitin sulphate (CS) derived from cartilage. The processes were developed at laboratory scale and the cost of manufacture calculated and compared with the conventional processes for production of BSA and CS.

For BSA manufacture, the reduction in the calculated cost of production represents a saving of \$14 per head. More importantly in the case of BSA is that the lower cost of production may facilitate commercialization of BSA as a food ingredient. For CS manufacture, the calculated cost of production represents a saving of \$15 per head. The lower cost could aid market entry without sacrificing margin, allowing competitive costing against low cost international suppliers. The next stage in this initiative is production of kg lots of the products and securing customer (industrial) feedback. In both cases, an independent party is being retained to confirm the economics and market potential.

OUTCOME 5

Improving sustainability

► HIGHLIGHTS

Sustainability in the industry relates to a multitude of influences that may be social, economic, infrastructure and environmental in nature. The red meat processing industry is Australia's largest food manufacturer and Australia's largest food exporter. It generates annually \$16.2 billion in GDP, \$7.6 billion in household income, \$5.8 billion in exports and 148,000 jobs when flow-on effects are included.

The industry is heavily export dependent with over 60% of its production exported. Similar to most other agricultural industries, red meat processing businesses face considerable challenges, including international competition, volatile markets and trading conditions, declining resources and capability, labour shortages, changing customer and trading partner requirements, climate variability and other issues.

The Australian red meat industry is an important custodian of vital natural resources and a significant proportion of Australia's land mass. The ongoing success and reputation of the industry will depend on the way in which these natural resources are managed. A key focus will be on improving understanding of the natural resource base, apply strategies to identify mitigate and manage the impact of manufacturing on the natural environment and to identify, capture and implement beneficial effects and practices.

Meat processors face a number of key environmental drivers across waste, wastewater, energy, nutrient and carbon management and as such these areas are key themes for AMPC's RD&E programs for the next 5 years. In accordance

with the *Red Meat Processing Climate Change Strategy* developed in 2011, key activities will include understanding the effects of climate change on the red meat processing sector and developing measures to reduce the industry's contribution to greenhouse emissions. Activities will also include benchmarking resource utilisation, developing tools, processes and technologies to improve resource use efficiency and manage waste and establishing alternatives to current waste management including recycling, value adding from waste products and producing and utilising waste products for alternative purposes.

This strategic imperative is underpinned by the following key focus areas:

- Investigating, understanding, communicating and responding to changes and influences in the red meat processing industry;
- Technologies, practices and procedures that contribute to improved waste management systems and that add value to waste products;
- Improving industry knowledge and capability to achieve sustainable resource management and adapt to climate change;
- Examining options to integrate new technologies and improve industry infrastructure;
- Business sustainability and continuity is enhanced.



Effect of rendering/blood processing on abattoir waste and emissions (A.ENV.0152)

Waste streams from rendering and blood processing contain environmental pollutants which have to be removed by effluent treatment. They also contain protein, other solids and fat which represent product losses. Losses from abattoir rendering plants that use continuous wet-rendering (low temperature rendering) systems can amount to as much as \$2.5 million per year. These losses are not necessary and are fully contained in products at independent renderers.

The aim of this project was to provide benchmarks of the composition of waste streams and to identify strategies to reduce the contribution of waste streams to environmental loads and product losses. The project involves surveying five sites with various integrated rendering operations, with samples taken from the waste streams in order to quantify the COD, TN, TP, total solids, oil and grease present. Estimates of the volume of the waste streams, raw material input and product output will be made in order to calculate an open mass balance for the rendering plants and determine the effect of the rendering and blood processing operations on GHG emissions arising from waste water treatment. Strategies will be recommended to control and reduce the losses. Surveys have been completed at 3 of the 5 sites with the remaining surveys to be completed before the end of November and a project report produced shortly after.

Carbon emissions – measurement, reporting and strategic implications (A.ENV.0157)

This project involves the investigation of measurement, calculation and reporting methods (including options for direct empirical measurement) available to the Australian meat processing industry to meet requirements of the National Greenhouse and Energy Reporting Scheme (NGERS) and assessment of the impact of method choice on GHG emissions calculations particularly as this relates to applications of NGERS methods 1 and 2 for the calculation of wastewater emissions.

This project consists of 2 separate but connected tasks which seek to review and update existing guidelines for wastewater emissions calculations at meat processing facilities and associated implications, then develop a checklist tool for methods 1 and 2 for processor use to meet financial audit requirements under the carbon pricing mechanism. There have been several working group teleconferences between the consultancy and industry to refine the scope and address specific questions and needs of processors.

Both the updated guidelines and checklist have been produced in draft form and are undergoing review. 2 case studies are being prepared involving AMPC members. The completed guideline and checklist are expected in December 2013.



Integrating solar photovoltaics (PV) with bioenergy generation, cogeneration or tri-generation systems at red meat processing facilities (AM12-5065)

The challenges facing the Industry during the shift to a low carbon economy are diverse and complex. Broadly speaking, they include:

- Achieving cost effective and sustainable mitigation of GHG emissions whilst protecting against future energy price increases;
- Meeting market expectations for low carbon food supply chains;
- Understanding and complying with regulatory obligations regarding energy and climate change, including the Carbon Pricing Mechanism (CPM).

This project aims to explore one means of addressing these challenges by considering the potential for integrated solar PV with bioenergy generation, cogeneration or tri-generation systems at Australian red meat processing facilities.

3 red meat processing facilities agreed to have feasibility studies carried out. The plants comprise mixed species and individual slaughter operations ranging from 3,500 lambs/100 cattle up to 1,100 cattle. Each facility has rendering operations on-site. The feasibility studies have been completed and a summary report will be made available to industry in November 2013.

Integrated agri-industrial wastewater treatment and nutrient recovery Year 2 (A.ENV.0149)

Covered anaerobic lagoons (CALs) and uncovered anaerobic lagoons (ALs) are widely used for treatment of wastewater from Australian abattoirs. However these systems often result

in a greater release of methane and odour into the atmosphere from the anaerobic degradation of organic matter (in ALs), a greater whole of life cost, and poorer nutrient and energy capture efficiency compared to engineered high-rate in-vessel anaerobic systems.

High-rate anaerobic systems offer a smaller footprint and almost complete elimination of odour, providing key advantages to urban or peri-urban processors. One of the emerging technologies for high-rate anaerobic treatment of abattoir wastewater is anaerobic membrane bioreactors (AnMBRs). These offer advantages of effluent quality, with renewable energy production, and the potential to manipulate operational conditions for optimal nutrient recovery. However, there is very little information on design or selection of processes for AnMBR design or operation on abattoir wastewater, and in particular the role of fats on membrane fouling is unknown. There is also a very high process risk due to a lack of industrial references.

A 200L capacity AnMBR has been constructed in the laboratory and at University of Queensland's Advanced Water Management Centre. A series of critical flux tests have been used to assess the impact of common membrane configurations and key process conditions on AnMBR operation and/or viability. Results to date confirm that higher sparging rates will reduce fouling and allow higher flux. AnMBR temperature did not have a significant impact on critical flux in the range of 25-35°C. Fouling characteristics of digested sludge appeared slightly better than raw slaughterhouse wastewater.

Critical flux tests were completed for three membrane configurations (two submerged configurations and one external configuration). Critical flux for the submerged membrane configurations (flatsheet and hollow fibre) were

similar from a design and operational perspective and within the range previously estimated for AnMBR cost-benefit analysis.

The next step in the project is to proceed with an AnMBR pilot plant to validate the critical flux results under long term continuous testing and optimise the AnMBR operation. The long term objective of the AnMBR is to treat raw slaughterhouse wastewater at a hydraulic retention time (HRT) of less than two days while removing over 90% of organic material (COD).

High rate aerobic treatment combined with anaerobic digestion & ANAMMOX (A.ENV.0150)

This two-year project is continuing to investigate a novel approach for treatment of red meat processing effluent. The project incorporates three key elements:

- High rate aerobic (pre-) treatment to convert the organic material in wastewater into easily degradable biomass;
- Anaerobic digestion of the biomass generated in the first stage and conversion to biogas;
- Nitrogen removal via an anaerobic ammonium oxidation (ANAMMOX) process.

The outcome of this project will be the evaluation of the technology to maximise the chemical oxygen demand (COD) and nutrient removal performance while minimising the energy demand for the treatment of meat processing wastewater. While this project focuses on the development and demonstration of the process at the laboratory scale, it will identify major design and performance parameters that will be essential for the evaluation of the possible suitability and economics of the process once implemented at full-scale.

Therefore, a key outcome of the project will be the design, operating and performance parameters for this innovative technology that could provide an economic alternative to current treatment options in situations where nutrient removal is important and/or space availability is limited and hence anaerobic lagoons plus sequencing batch reactors (SBRs) are not an ideal option.

A high-rate aerobic process has been evaluated by varying the sludge retention time (SRT) between 2-4 days and hydraulic retention time (HRT) between 0.5-1 day in an SBR. This process is most effective under operating conditions of 0.5 day HRT and 2-3 days SRT, with >80% of carbon and phosphorus removal and >50% nitrogen removal.

Anaerobic degradability of waste activated sludge generated from the high rate process has been determined using batch tests and model analysis. Results showed the sludge can be successfully digested (>70% degradability) to release the carbon in the form of methane through either mesophilic (37°C) or thermophilic (>55°C) processes. Assessment of dewaterability of the digested sludge showed that the free water content was generally <10%, indicating solar drying could be a suitable dewatering method in practice.

The latest activity within the project saw the integration of 2 separately evaluated processes (high-rate aerobic treatment and anaerobic sludge digestion) together with a newly

established ANAMMOX-type process (for Nitrogen removal in the sludge dewatering liquor) as one system under continuous conditions to form a treatment train for red meat processing effluent.

The high-rate aerobic treatment stage has shown unexpected and very promising Phosphorous removal ability whilst the anaerobic digestion stage has provided highly digestible sludge.

Given the success of the project to date, a 12 month extension has been granted to identify bacteria responsible for high Phosphorous removal, reduce hydraulic retention intervals in the digester to 1 day, and develop a standard operating procedure for reliable, stable and predictable operation of the digester and nitrogen removal process.

NGERS and wastewater management – mapping wastewater streams and quantifying the impacts (A.ENV.0151)

This project involves the next phase of waste stream characterisation (relating to project A.ENV.0131 – Energy and nutrient analysis on individual waste streams). It is intended to identify key contributors to waste stream loads and resources, including thermal, energetic, and chemical. This is partly driven by 2 factors; firstly, a lack of knowledge in the area of energy and nutrient analysis area required to guide informed decisions into building wastewater infrastructure; and secondly, the introduction of the CPM which put a price on GHG from wastewater treatment systems at permit liable facilities.

The project extends the activities undertaken during the previous year (literature review, three site visits, and detailed chemical, biochemical and statistical analysis) and includes additional site visits to further characterise the waste streams present across the range of red meat processing facilities. An additional four site surveys have been completed and a draft decision support tool developed following detailed analysis, particularly at the production level. The composition of individual wastewater streams varied depending on the source within the slaughterhouses and ranged from low strength (boning) to very high strength (rendering) with TCOD over 70,000 mg L⁻¹, there were also large differences in the concentrations of key nutrients including Nitrogen, Phosphorous and Potassium. Biochemical methane potential varied from 250-300 L CH₄ kgVS⁻¹ for cattle yard and paunch wastewater to 500 L CH₄ kgVS⁻¹ for slaughter floor wastewater and over 1000 L CH₄ kgVS⁻¹ for rendering wastewater. However, there were also indications of oil and grease inhibition when treating rendering wastewater. Rendering and paunch wastewater were concentrated resource streams that contribute up to 75% of the methane potential, phosphorus and potassium loads, in only 20% of the volumetric flow. Compared to the final effluent, phosphorus was 2 – 4 times more concentrated in the rendering and paunch wastewater streams. These concentrated streams provide opportunities to enhance the recovery of nutrients using crystallisation technologies. Therefore source capture and specialised primary treatment of individual wastewater streams is recommended.

2 final site surveys have recently been undertaken and the findings will be used to develop the decision support tool which will be released to industry in early 2014.

Nutrient recovery from paunch and DAF sludge digestate (A.ENV.0154)

The basis for this project was to collaborate with the Grains Research and Development Corporation towards the application of struvite recovery technology to determine value-add in relation to nutrient recovery from meat processing wastewater processes.

This project has been run in conjunction with numerous other projects administered by the Advance Water Management Centre at the University of Queensland (UQ). A successful co-digestion trial was undertaken at the UQ lab and the accumulated digestate will be used to support another trial targeting management of solids in processing stream before trialling the struvite recovery technology in the field during 2014.

Feasibility study to qualify the approach for applying anaerobic ammonium removal technology for wastewater treatment at red meat processing facilities (A.ENV.0164)

This project aims to qualify the approach for applying a new energy efficient nutrient removal technology and process. The focus of the project will be to investigate and assess the application of anaerobic ammonium removal (AAR) technology, based upon the use of microorganisms such as ANAMMOX bacteria, within wastewater treatment systems at red meat processing facilities.

The project involves 3 feasibility studies which include an examination of the current technologies and processes in place and determination of the key requirements, considerations, costs and practical approaches required to integrate AAR technology. This project has recently commenced and the initial findings are due in the early 2014.

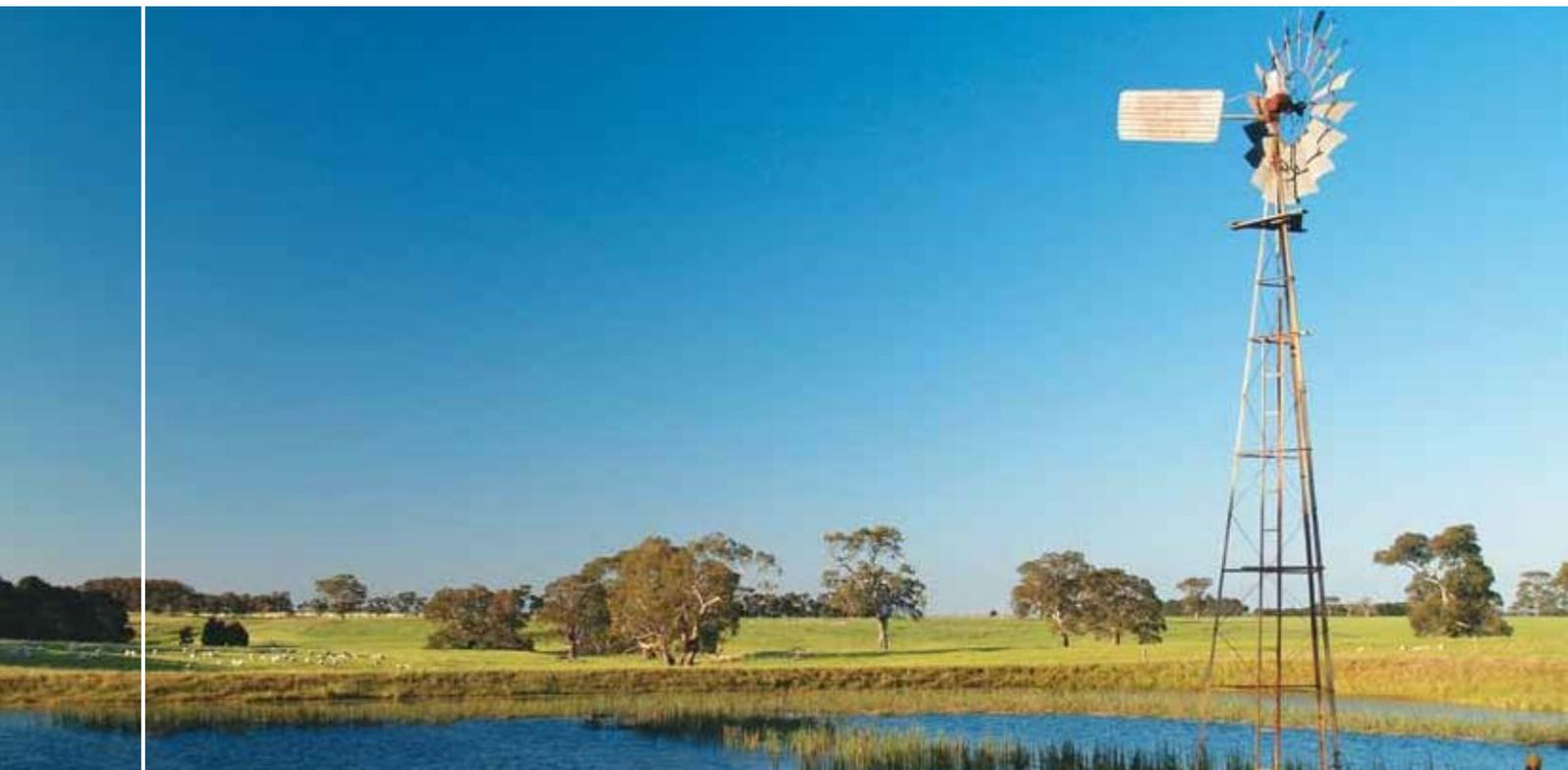
Review and evaluation of the application of anaerobic ammonium removal technology for wastewater treatment at red meat processing facilities against conventional options/ technologies (A.ENV.0162)

This project will build upon current research in this area (particularly A.ENV.0164) and will include a review of the application of anaerobic ammonium removal technology for wastewater treatment at red meat processing facilities against conventional technologies and processes.

The review will include national and international publications detailing the application of anaerobic ammonium removal technologies and practices and qualification of the next RD&E opportunities taking account of current projects and activities in the meat processing scientific arena. This project has recently commenced and the initial findings are due by the end of 2013.

Biogas quality study (A.ENV.0093)

A thorough understanding of biogas composition and its quality is an essential element in determining the suitability of the recovered biogas as an energy source. However, there is little published information on the composition and quality of biogas captured from a typical CAL used in the Australian red meat processing industry. This project investigated the quantity, quality and production characteristics of biogas produced from CALs at 3 Australian red meat processing sites. Waste water samples were collected across the inlet and outlet wastewater streams at each of the sites, as well as biogas samples from the CALs. The wastewater samples were tested for COD and biological oxygen demand (BOD) loadings and degree of removal, suspended solids, and volatile suspended solids. The biogas samples were tested for several chemical species (i.e. methane, carbon dioxide, hydrogen sulphide,



ammonia, nitrous oxide, carbon monoxide, water and volatile fatty acids) that are likely to affect its use in energy generation equipment.

The dominant biogas components found during the analysis were Methane, Carbon Dioxide, Nitrogen and Argon. Methane levels were greater than 67% on all visits. Of particular interest was the speed at which the methane conversion commenced inside the CAL, with significant methane production levels observed within 4-6 weeks. The project report is available for download from the AMPC website in the 'Reports Library' section. The results of this study are supporting further work including the investigation of options for cleaning biogas for use in energy generation equipment and also providing important baseline data on biogas production, quantity and quality from red meat anaerobic wastewater treatment systems.

Review of biogas cleaning (A.ENV.0098)

Anaerobic treatment of wastewater from Australian red meat processing plants produces significant volumes of biogas containing methane which can be captured and used for on-site energy generation. The 3 most common uses of recovered biogas typically include:

- › Consumption as energy-rich boiler fuel;
- › Co-generation using a reciprocating gas engine or micro-turbine to generate electricity and hot water;
- › Flaring in a purpose-built flare.

Biogas mainly consists of methane and carbon dioxide but also contains a number of other constituents, such as hydrogen sulphide and water, which can have adverse impacts on combustion, storage and handling equipment. The corrosive nature of hydrogen sulphide is well known. Water can promote the corrosivity of the biogas, lead to higher wear and tear in reciprocating gas engines and also accumulate at any low sections of pipe causing biogas flow restrictions, if the piping system is not designed with correct falls and condensate removal. This necessitates the removal and management of impurities such as hydrogen sulphide and water.

AMPC and MLA have funded research into the common uses of biogas, the adverse impacts of various biogas constituents, as well as various impurities management and removal options.

A number of hydrogen sulphide removal technologies have been identified, outlined and evaluated in terms of suitability, operability and cost. These included sodium hydroxide scrubbing, water scrubbing, biological treatment and adsorption onto iron containing media. These findings and more can be found in the project report which is available for download from the AMPC website.

Biogas manual and extension notes (A.ENV.0160)

The introduction of the CPM coupled with rising energy costs is compelling processors to consider ways of reducing GHG from waste water treatment systems. GHG emissions from anaerobic waste water treatment accounts for around half of Scope 1 GHG emissions from large meat processing facilities. Consequently, there has been an increasing amount of research into anaerobic waste water treatment technologies especially CAL

technology with biogas capture and combustion systems, that enable capture of GHGs (contained within the biogas) as well as energy from waste applications such as biogas boilers.

AMPC and MLA are funding the development of an industry-specific guideline for the safe installation, capture, transport and use of biogas from anaerobic wastewater treatment technologies based on CALs. This follows on from previous work to develop a similar product in the *Waste Management Manual* now available from AMPC. In addition to this, a more general biogas manual will be developed which outlines the range of anaerobic technologies appropriate for use in the meat industry and their main features, biogas properties, the range of uses for biogas and relevant considerations.

A biogas manual has been developed in draft form which outlines the current position regarding regulation of biogas production, storage, transport and use on a State-by-State basis. A review panel will be assembled to appraise the guidelines and manual and ensure they meet the requirements of the various State regulators before being released to industry in early 2014.

Paunch value adding, energy, nutrient recovery and reducing carbon exposure (A.ENV.0153)

Currently most abattoirs dispose of their paunch waste (PW) and dissolved air floatation (DAF) sludge via either composting or landfill. These disposal methods can incur disposal fees, particularly if landfilling is practiced. A previous industry study entitled 'Use of paunch waste as a boiler fuel' (A.ENV.0110) confirmed the technical and economic viability of co-combusting dewatered PW in a boiler. If co-dewatered PW and DAF sludge can be successfully co-combusted in boilers, waste disposal costs will be further reduced and energy recovery maximised. This project was designed to provide this information for the red meat industry.

2 major project outcomes were sort from this project, namely a comprehensive international review of PW (and DAF sludge) dewatering technologies and the impact of solid waste characteristics on dewatering performance and subsequent combustion, as well as a commercial demonstration dewatering trial to verify performance including energy and nutrient recovery.

A thorough review of the published international literature revealed that there is very little valuable and relevant published information regarding the performance of PW dewatering systems. Results from an industry survey on PW and DAF sludge indicated that the majority of abattoirs use screw presses for dewatering of their PW. In addition the survey revealed that 92% of the respondents land applied their PW and 8% sent the dewatered PW to landfill.

The dewatering technology assessment program identified that the Rotary Fan Press (RFP) was the most promising new dewatering technology to trial. The results from the trial revealed that the RFP did not improve cake solids levels but did provide improved solids capture. Thus the RFP will not improve the economics of energy recovery from PW, however nutrient recovery via precipitation of struvite from the PW filtrates appears to be technically feasible. Costs were developed for an integrated PW management system



comprising RFP dewatering, nutrient recovery via struvite precipitation from the filtrate and energy recovery from the cake via co-combustion in the abattoir boiler. The economics of this proposed PW management system does not appear to be attractive, even for large abattoirs (1,600 head per day).

Additional trialling of this technology is required to confirm the technicalities and economics of the process. The final project report can be downloaded from the AMPC website.

Facilitation of the Energy Efficiency Information Program (EEIP) for meat processing (AM12-5066 & AM13-5072)

The EEIP was established by the Australian Federal Government in 2012. The program is targeted at industry associations and non-profit organisations that provide energy efficiency information to small-to-medium enterprises (SMEs) and community organisations.

The program directly supports the research, development, dissemination and evaluation of energy efficiency information by trusted sources. AMIC was awarded funding under this program. AMPC and MINTRAC have since worked in partnership with AMIC to develop of an engagement, extension and education program for SMEs in the Australian Red Meat Industry.

The project is intended to raise awareness of the potential to improve the energy and environmental performance of small to medium sized red meat processing facilities, and to encourage positive management action. It describes four types of facilities which can form the basis for characterisation and comparison against other similar facilities throughout the Australian Red Meat Processing Industry. It also outlines technical and management measures to identify and quantify energy saving opportunities. The objectives of the project are to:

- Increase energy efficiency awareness levels and encourage behavioural change within the red meat processing industry;
- Increase investment in energy efficiency within red meat processing businesses and their supply chains;

- Develop and disseminate the most up-to-date and relevant information on energy efficiency technology and best practices available to the red meat processing industry;
- Improve understanding of available energy efficiency funding options for red meat processors; and,
- Ultimately, reduce expenditure on energy within the SMEs throughout the AMPC and AMIC membership which will in-turn help these businesses to remain viable.

Under this project AMPC has currently produced the following outputs:

- Benchmarking Reports (Summary Report on Energy Efficiency Opportunities for NSW Domestic Processors & Review of Energy Efficiency Utilisation Benchmarks & Technologies for Australian Red Meat Processing);
- Literature Reviews (Review of Renewable Energy and Energy Efficiency Options for the Australian Meat Processing & Review of the Usage of Covered Anaerobic Ponds for Energy Savings);
- Energy Consumption Guide;
- Energy Management Plan (template);
- Fact Sheets (multiple).

Facilitation of water reuse (various projects aimed at water and energy efficiency whilst maintaining food safety)

AMPC has developed several projects aimed at identifying and trialling water efficient technologies, systems and processes that deliver water consumption and cost savings to meat processing facilities whilst maintaining food safety standards. The objective of each project was to facilitate trials which demonstrate mechanisms for reducing water consumption in meat processing facilities. Each project is summarised below. More recently, AMPC has commissioned a further project to canvass options for energy and water efficiency whilst maintaining food safety. Processors will be interviewed so that individual process and configurations can be accounted for when determining these priorities and then AMPC will seek to build an ongoing program in the area that includes 2-3 projects per year around practice change for resource efficiency in industry, as well as adoption within approved arrangement guidelines.

Steam sterilisation of viscera trays (A.ENV.0136)

The project involved trialling the use of steam as a replacement for hot water ($\geq 82^{\circ}\text{C}$) for the continuous sanitation of the pans used.

Unfortunately due to unforeseen engineering delays at the trial site the commissioning of the trial has been prevented. However, AMPC will continue working with the site to progress the trial. As the trial takes place, each test method will be evaluated microbiologically over 5 separate days for each of the 2 tables using 20cm press plates. 2 samples from different pans or slates are to be collected 3 times a day. In total 30 samples from each table for each method will be collected for assessment by total viable count, total coliform and E. coli.

Viscera table steriliser and cooling water reuse (A.ENV.141)

A large quantity of water is used to sterilise and cool moving-top viscera tables. The quantity reported varies widely but is generally considered to represent around 20 % of total water use with consumption calculated at between 500 – 600 litres per head.

The viscera table steriliser and cooling water has previously been identified for potential reuse purposes at the trial site. The trial involved re-use of the same viscera table water for washing paunch; the surrounding area of the paunch opening room; and beef runners for inedible purposes. The trial also involved the single re-use of cold and hot potable water from the beef viscera table for paunch opening and relating activities. A preliminary analysis revealed that 19,460 kilolitres of water could be saving could be saved over one production year.

Hot and cold water from the sterilisation and cooling unit on the beef viscera table was collected within a depository tank connected directly with the table's drainage system. The water was coarsely filtered to remove solids but was not otherwise treated. This water was then tested to ensure it meet all required standards as per *The Australian Standard for the Hygienic Production and Transportation of Meat and Meat Products for Human Consumption* in regards to Coliforms and E. coli levels.

Unfortunately the results indicated a high level microbiological contamination and therefore the water could not be re-used. However, if further treatment was to occur there is still the potential for reuse of this water. AMPC is currently looking into the potential of a project that will address this issue.

Dry cleaning of chillers (A.ENV.0138)

Cleaning is one of the most water-intensive activities at abattoirs, estimated to account for 20-25% of total water consumption. Under this trial, AMPC evaluated the effectiveness of a manual cleaning program for beef carcass chillers. The cleaning method was based upon manual cleaning methods and the following principles:

- Each chiller was cleaned daily through the use of dry and manual cleaning processes;
- Each trial chiller was subjected to a hygiene inspection following cleaning in accordance with the trial establishment's existing approved standard operating procedure;
- The cleaning of overhead structures, including evaporators and drains, was maintained in accordance with the standard operating procedure.

The trial achieved some outstanding results including 74% reduction in water use; 93% reduction in detergent concentrate; 60% reduction in labour input; replacement of 80°C hot water with 30°C water; and commensurate reductions of water and cleaning chemical in waste discharge.

Tripe wash water reuse (A.ENV.0137)

The purpose of this trial was to evaluate the effectiveness of water reuse in the processing of beef tripe. AMPC

commissioned the design and development of a custom fit recycling unit that will return thermostatically controlled hot water from the refining process to the scalding process in a single recycle operation. Microbiological content in the tripe is to be assessed prior to and during the trial for comparative purposes. Microbiological testing of the reuse water will also be conducted during the trial. The trial equipment has been installed at the test site, however a number of problems have occurred during the commissioning of the equipment. AMPC are continuing to work with the trial site to resolve the issues and generate results from the trial.

Hygienic design guidelines for Australian red meat processing (A.ENV.0139)

Failure to comply with red meat processing hygiene standards results in increased operating costs due to increased frequency of hygiene monitoring, reduced meat quality due to microbial spoilage contamination, product rejection due to pathogen contamination, and delays in production schedules due to re-cleaning of equipment.

The Australian Red Meat Industry has identified a need to focus on cleanability and hygienic design of equipment in order to reduce water and labour costs associated with equipment cleaning, whilst maintaining food safety standards.

AMPC and MLA have funded the development of a set of guidelines and checklist tool for processors that outlines the major equipment cleanliness parameters, targets, methods and reference guidelines available to industry. The guidelines include a review and summary of regulatory obligations that must be met, an on-site appraisal of meat processing equipment and procedures, and current hygiene and design issues facing processors. In particular, cleaning techniques including manual cleaning, high pressure cleaning, cleaning-in-place and foaming as well as the efficacy of cleaning agents have been reviewed and compared.

A literature review and surveys at 4 processing facilities have been undertaken to review existing guidelines for improving hygienic cleaning practices, as well as develop new guidelines where required, whilst taking into consideration the resources used for cleaning, including water, energy and labour costs. A final report has been prepared and can be obtained by contacting AMPC.

Identifying and Enabling the Capture of Recycled Water Opportunities in Sustainable Food Production and Manufacture (A.ENV.0142)

The aim of this project is to identify and enable water recycling opportunities through an integrated systems analysis and technology assessment in the agri-food industry. Effort will focus on addressing current industry challenges, including regulatory/policy pressures, developing strategies to increase acceptance by consumers of water recycling and enhance the sustainability positioning with customers/consumers, economic/ higher value-proposition evaluation and applying new technologies /risk assessments to enable broader and increased implementation. The project will have a cross-sector approach with outcomes addressing water recycling interests with stakeholders in meat, dairy, horticulture and broader food manufacturing and retail.



All the sub projects have made progress. In the consumer research project, an intensive choice modelling experiment was carried out with 200 consumers to study the values and attitudes of consumers when consuming foods associated with recycled water. A prototype value proposition tool has been prepared as an Excel spreadsheet. It is proposed to engage with industry to evaluate this tool in order to get feedback so that this tool could be further developed to enable decisions to be made for different water recycling scenarios.

A survey of water reuse/recycling within the Australian meat industry was conducted via an online survey of AMPC members. Results of water use have been analysed and used to inform the development of the value proposition tool for evaluating various water recycling opportunities. Wastewater generation is approximately 92% of the raw water usage in beef and sheep processing plants. In most plants there is very little separation of waste streams prior to treatment. The major sources of phosphorous are:

- Manure & paunch;
- Rendering plant;
- Effluent.

The major sources of nitrogen are:

- Rendering;
- Slaughter;
- Manure and paunch.

The lowest COD sources are:

- Chillers;
- Boning room;
- Fellmongery.

The top three priority areas for water recycling in-plant are:

- Viscera table steriliser and cooling water for paunch initial emptying or initial viscera table wash;
- Edible offal wash water to stockyards and truck wash;
- Slaughter floor knife steriliser and hand-wash water to non-potable uses.

While the economics for implementing water recycling suggest a longer term payback (> 5years), in cases where the availability of water limits production or where potable water exceeds \$3.00 per kL water recycling initiatives become viable. Membrane bioreactors, integrated fixed-film activated sludge sequencing batch reactors may represent viable options for removal of endocrine disrupting compounds (ECBs) including estradiols, nonylphenol, bisphenol A, polychlorinated biphenyls (PCBs) and some pesticides.

OUTCOME 6

Building capability and influencing practice change

► HIGHLIGHTS

The value of research and development is realised when outcomes are taken up and successfully implemented by enterprises along the value chain. More attention is now being paid to improving the capacity of the primary industry representatives in both industry and Government to apply the products of science and research and to understand how boosting this capacity and improving their business models will better serve market and customer needs and secure productivity benefits.

The direct involvement of industry and individual businesses in RD&E activities has demonstrated the importance of highly skilled personnel in specific disciplines for meat processing companies. Companies are increasingly seeking to employ personnel with environmental, science, microbiology, engineering, marketing, economics and business degrees in order to advance their business strategies, deliver projects and new products and engage with customers on complex issues including the role of science underpinning industry standards and systems.

AMPC recognises the significant benefits in improving coordination and collaboration across government, RDCs, industry and educators in delivering outcomes for the meat processing sector. Strengthening partnerships between Government, industry and educators will also help to reduce duplication and improve efficiencies. AMPC's RD&E programs will continue to include extension and education elements for transparent and effective communication and engagement of industry.

This strategic imperative is underpinned by the following key focus areas:

- › Engaging key stakeholders to create awareness and demonstrate value;
- › Increasing industry capability and capacity;
- › Increasing research capability and capacity;
- › Evaluation of RD&E outcomes.

Meat inspector skills currency (A.MIN.0129)

Accuracy and currency of meat inspection determinations are critical aspects of ensuring that a safe, quality product is produced by the industry. This project sought to work with industry stakeholders to develop a program of currency assessment through which practicing and aspirant meat inspectors, at both levels III and IV, can demonstrate currency of knowledge and skill.

Through this program it is now possible to address shortfalls in competency. Employers are able to identify skills and knowledge gaps and undertake appropriate self-paced training and/or practice under supervision prior to reassessment. This project provides meat processing companies with a ready-to-use competency and currency assessment tool. Furthermore this project forms part of the meat industry's strategy to ensure the competency of company personnel performing post and ante-mortem inspection.

In addition to being able to assess the currency of a meat inspector's knowledge the industry also wanted to ensure that candidates were supported through the process and given opportunities to revise. The project has now been finalised with the modification of the existing MINTRAC exam generator to enable it to generate quizzes for the assessment of the currency of a meat inspector's knowledge and the development of e-learning materials which allow candidates to revise/review post and ante mortem inspection training materials prior to undertaking a currency assessment. This project has identified and developed avenues whereby meat inspectors competency can be gauged and assessed regardless of age, time out of industry, or other employment related issues.

Yard, lairage and restrainer design (A.MIN.0127)

There has been considerable research into appropriate design parameters for cattle yards, lairage and restrainers. As new research continues to develop, there is a need to extend this information for practical use by processing engineers.

This project sought to quantify the existing research and design parameters and animal behavioural characteristics. The project aims to develop an extension package that accounts for available resources in this area, as well as identifying the gaps and future priorities for research in Australian processing establishments. The information will be used to update and upgrade existing facilities, or for reference and incorporation into the construction of new handling facilities on plant.

The objectives of this project are to provide lairage managers, processing plant managers and engineers with the skills and knowledge to ensure yard, lairage and restrainer design, modification and maintenance practices are reflective of current research outcomes and ensure that existing industry training incorporates best practice in yard design to ensure compliance with relevant industry standards and codes.

Good handling facilities help to produce a quality product. Poor facilities will lead to increased stress and/or injury to livestock and as well as making livestock more difficult to handle thus increasing the level of stress and/or occurrence of injury to the handler. There are also economic implications with a 2005 study identifying financial losses through bruising estimated to be \$22.5 million that year in the Australian beef cattle industry.

Having good facilities allows livestock to be moved throughout the yard minimising stress prior to processing.

Current project status has reviewed available literature and industry scan of yard design. This will be incorporated into an interactive online module for processors to use when considering updating/upgrading or constructing cattle yards, lairage and restrainers.

Delivering livestock handling to processors (A.MIN.0135)

This project aims to address industry's need with regards to the use of dogs and horses in red meat processing facilities. Specifically, this project will investigate current horse rider associated Units of competency/training to assess applicability to beef processing plants and for use in decreasing WH&S risks. This project will also focus on small stock processing facilities by assessing the impact of working dogs on the welfare of sheep in lairage. These outcomes will facilitate identification of techniques for minimising impacts on animal welfare while still having the utility of working dogs and horses in meat processing facilities.

This project is currently underway with stage one being completed recently. This initial stage produced a literature review that investigated the use working dogs and stock horses. This review highlighted both the lack of scientific literature available on this topic specific to meat processing facilities and identified the need for further targeted investigation in these areas.

The next phases of this project will involve the production and implementation of new and updated training materials in these areas based on findings from the review of training units. These training materials will be launched at train-the-trainer workshops in 2014.

Meat industry related training networks

AMPC invests in a range of extension networks that involve keeping members current with industry RD&E activities. AMPC facilitate the delivery of RD&E related activity through 3 main industry networks convened by MINTRAC. Namely:

- Meat Industry Professional Development Program;
- Meat Inspection and Quality Assurance Network;
- Meat Industry Training Network.

The meat industry professional development program (2013/9422)

The Meat Industry Professional Development Program is designed to extend RD&E outcomes into daily practice and ongoing industry training programs, foster consistent, high quality technical expertise of industry practitioners, facilitate early identification and addressing of critical training requirements, and build industry capability to incorporate new knowledge and innovations into the industry training system. Throughout 2012/13, 25 programs ran, with a total of 426 attendees. Courses were offered in a wide range of areas including:

- Animal Welfare Officer Skills Set;
- QA for Supervisors;



- › Livestock Handling;
- › HACCP;
- › Internal Auditor Training.

The meat inspection and quality assurance network (2013/9421)

The Meat Inspection and Quality Assurance Network is designed to facilitate the dissemination and application of information that impacts on quality or food safety from regulators, researchers and industry bodies, ensure the smooth implementation of regulatory and technical initiatives, and ensure that training programs reflect industry's needs through the provision of updated training materials and professional development to trainers and lecturers. This program is aimed at providing a forum for regulators and industry bodies to explain changes in the regulatory environment and update RD&E activities to plant QA managers and discuss how this could impact meat processing facilities. In 2012/13 fourteen QA Manager network meetings were held across Australia, with a wide range of issues raised, discussed and addressed. These topics included:

- › Port of Entry rejections;
- › A review of MHA and recalibration of carcass and carton product assessment;
- › Requirements and training for NLIS;
- › Importing country micro testing requirements;
- › RD&E outcomes of completed AMPC funded projects into meat safety and meat quality.

The meat industry training network (2013/9420)

The Meat Industry Training Network are designed to facilitate the transfer of knowledge from research outcomes to training programs as part of the uptake of innovation in the meat processing industry; and ensuring that the meat industry training system meets the business and strategic requirements of the industry. These networks ensure that the training personnel of the meat industry have currency of knowledge and skills and that training for the meat industry continues to address industry priorities and requirements.

12 training network meetings were held during 2012-2013 across Australia. In addition to these network meetings, The National Training Conference and Meat Industry Training Awards were also held. A wide range of issues were raised, discussed and actioned through these networks including:

- › EU training requirements;
- › Induction program for professionals entering the meat industry;
- › Increase in enrolments in the Certificate III in Meat Processing (Food Services) qualification;
- › OPVs assessing the post-mortem unit;
- › Requirement for AAO – refresher training.

This suite of Meat Industry Related Training Networks were successful in addressing and communicating industry RD&E developments to members. As a result of these successful outcomes, AMPC will continue investing in these 3 programs throughout 2014.



AMPC building capability in science – 2012-2013 postgraduate RD&E programs

AMPC supports RD&E opportunities for future post-graduate, graduate and post-doctoral students, as part of the strategy for building scientific capability in meat processing related disciplines.

The below sections provide a summary of the current post-graduate students, ABARES award winners (sponsored by AMPC) and post-doctoral programs in meat processing.

Sarah Stewart – The influence of pre-slaughter stress on the meat quality and carcass yield of prime lambs (AMPC and Murdoch University)

Current best practice for the treatment of lambs pre-slaughter is water available at all times (except during transport) and no more than 48 hours off feed from farm to stun. Work in beef cattle has shown a relationship between elevated levels of acute stress close to stunning (as determined by blood lactate concentration) and tenderness building on previous results found by Warner et al. (2007). There is relatively little work in lamb to underpin the best practice recommendations to maximise meat quality and carcass yield together.

Carcass yield is affected largely by time off feed (0.1%/hr of carcass weight loss after 12 hours of fasting) and dehydration (dehydrated lambs have a 2.5% reduction in carcass weight). Studies to unravel cause and effect in this area are difficult and require large numbers of animals, of different genetic make-up and from different production systems. A recent very small (48 lambs) European study using light weight indoor fed lambs (13.7kg HCW) found no difference between tail gate slaughter

and 12 hours lairage with respect to a variety of meat quality parameters (shipped direct from farm and trucked for 1 hour). However the same study did suggest lower levels of acute stress at stunning in the lambs placed in curfew for 12 hours. While of background interest, this study is not transferrable to Australian conditions due to different production systems, slaughter weights and transport/curfew times.

Benefits will include a clearer understanding of the roles of acute and chronic stress on meat quality and carcass yield. It will also underpin best practice slaughter pathways from an animal welfare point of view. The main aim of this project was to test the role of chronic and acute stress on meat quality and carcass yield in prime lambs. Utilisation of the Sheep CRC Information Nucleus lambs along with other commercial animals will underpin these requirements and represent the first large scale analysis in this area.

Dr Fiona Anderson – Lean meat yield, muscle and fat distribution and relationships with meat quality and human health traits (AMPC and Murdoch University)

While using genetic selection to improve lean meat yield in Australian sheep is a plus for industry and consumers, maintaining the nutritional value and eating quality of this premium product is critical. Recent evidence suggests that genetic selection using Australian sheep breeding values can re-distribute muscle from the lamb's forequarter to the loin region. While increasing the size of the loin is excellent for the industry financially, the impact this may have on muscle biology, metabolism and meat quality is a big unknown.



This project included sheep with a diverse range of genetic material and physiology. Muscle samples from the forequarter, loin and hind leg will be collected from genetically high and low-yielding carcasses to determine differences in muscle metabolism or fibre. A key concern for industry is that increasing yield may negatively impact on the processing, eating and nutritive quality of the meat. This project looked at issues relating to increasing muscle cell numbers and fibre type, including, for example, whether it adds nutritional value, such as iron, or fat content, which affects tenderness. Fiona was the recipient of the 2012 ABARES science and innovation awards for young people in Agriculture, Fisheries and Forestry with her Doctoral studies due for completion in 2014.

Stephanie Fowler – development and validation of a probe to measure meat quality-for on-line application (AMPC and Charles Sturt University)



Tenderness is deemed the most important factor in determining consumer acceptance. It is determined by the interactions between myofibrils and connective tissue and the extent of degradation of myofibrils. Due to this importance, considerable research has focused on the ability of technologies to objectively measure tenderness. A review of such technologies has highlighted Raman Spectroscopy as having the potential to be used for online assessment of meat quality traits as it is non-invasive, rapid, non-destructive and is not sensitive to varying water content. Recent research has not overlooked these advantages and several studies have been conducted to determine the ability of Raman Spectroscopy to predict sensory traits of beef silver-side, assess the effect of ageing on pork and investigate the relationship between cooking loss and shear force in lamb.

While informative, these studies are limited in terms of online application by the cooking, freezing or homogenisation of samples and the use of bench top devices. Further to this no studies have been reported on the measurement of unfrozen meat by Raman Spectroscopy and then measurement of shear force and other traits on the same piece of meat.

Via Suwandy – Enhancement of meat quality by pulsed electric field application (AMPC and the University of Otago and DPI NSW)

Masters candidate Via Suwandy is investigating the use of PEF as a tool to enhance meat quality. PEF is an emerging technology that can manipulate the structure of cells and cause the formation of electroporation in cell walls leading to the release of cellular materials into the extracellular surroundings. Depending on the processing conditions, this can be translated into higher extraction yields in plant tissues or death of microorganisms. The effects of PEF within a defined voltage range and frequency on the quality of hot-boned and cold-boned beef will be examined. 3 different muscles (longissimus, semimembranosus and triceps brachii) will be used to determine the optimum processing parameters for each muscle.

In the current project, parameters of purge loss, cooking loss and meat tenderness (shear force) to identify the optimum PEF treatment conditions for each muscle have been used to evaluate the economical and texture benefits of PEF treatments. Preliminary results suggest tenderness of loin samples was found to benefit from PEF treatment no matter the level of electrical input, whereas the level of tenderness of the topsides was increased by increasing the treatment frequency. Higher purge loss (%) and lower cooking loss (%) in PEF treated samples have also been observed. This project is current underway and due for completion in early 2014.

ABARES 2013 Science Award

The Australian Science & Innovation Award for young people in Agriculture Fisheries & Forestry supports young people to pursue their innovative scientific ideas that will deliver long term benefits to Australia's rural industries. The award for 2013 was presented to Honor Calnan from Murdoch University at the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) Outlook 2013 Conference. This project will look at issues relating to the discolouration of lamb meat and its impact on retail displays. The dis-colouration of lamb meat on retail display is an important problem for the lamb industry.



The sheep meat industry has bred lambs to improve eating quality but in the process of improving taste and health attributes, the colour of lamb meat appears to have been affected by premature browning. Lambs with higher levels of oxygen use in their muscles are also being selected as this correlates with high iron content. Research has shown that these 2 traits reduce colour stability, browning meat earlier after it hits the store.

Lamb meat currently has a shelf life of only 2 days before the price is discounted due to brown dis-colouration. Retailers trim, mince or discount lamb meat once it turns brown, as customers associate brown meat with a lack of freshness, excess bacterial growth and with imminent spoilage. This devaluation results in significant economic losses for the lamb industry.

The dis-colouration impact however could be significantly decreased by implementing a simple dietary supplement for lambs. Dietary supplementation with the anti-oxidant vitamin E has been shown to improve colour stability in fresh lamb meat samples.

Australian Intercollegiate Meat Judging Association

AMPC has been a major sponsor of the Intercollegiate Meat Judging (ICMJ) program since 2004. Now in its 24th year, the ICMJ program aims at exposing and encouraging tertiary students into careers in the meat industry. The ICMJ program is highly influential for students selecting the meat industry as a career option and is important in fostering future capability in the area of meat science. This is achieved through exposing students to the fundamentals of assessing and reporting meat quality attributes and providing opportunity to apply knowledge of practical aspects of meat science. In addition, a careers forum held during the event increases awareness of career opportunities that exist in the meat industry. This year 5 students were selected to represent Australia on the National team for a study tour of the USA in January 2013. These students were: Vanessa Campbell (Charles Sturt University – Wagga Wagga, NSW), Isaac Allen (Charles Sturt University – Wagga Wagga, NSW), Jordan Hoban (Charles Sturt University – Wagga Wagga, NSW), Rozzie O'Reilly (University of New England – Armidale, NSW) and Tim Ryan (University of Melbourne – Melbourne, VIC).

The Australian Team embarked on a month long study tour of the mid-west of the US. The tour encompassed visiting all sections of the US meat and livestock industry, from producer's right through to retail outlets, as well as visiting industry organisations and numerous universities. The trip exposed the students to one of Australia's major customers and competitors as well as providing a network of contacts that they can utilise in their future careers.

IFFA technology study program for processors

This project supported a group of AMPC member's attendance at IFFA in Frankfurt Germany (one of the largest meat processing trade-shows worldwide) and a broader study program involving visits to providers, processors and other key stakeholder sites in Europe to discuss technology approaches, strategies and to view new innovations.





The IFFA event showcased new technologies, automation products, and a wide range of exhibits covering slaughtering, carcass break-up, further processing, weighing, packaging, conveying, cooling, storing and transportation as well as a wide variety of value add processes including the manufacture of meal components and pre-cooked products and small goods using spices and additives destined for the retail and food service markets.

This project allowed Australian processors to engage with key stakeholders in the European Union (EU), to examine their specific approaches to technology development (and key solutions) and assess their applicability to Australian conditions and report on the findings in a manner that will inform industry strategy for future investment.

STEC and E. coli control in manufacturing beef – US study tour by a processor study group (P.PIP.0366)

In late 2012 the US established new rules relating to pre-existing and 6 additional STECs as adulterants requiring the application of HACCP to manage the risks associated with these STECs. Processors in the US are currently applying a range of different interventions to manage these risks as well as a range of testing and other quality assurance functions to respond to these new requirements. While Australian processors have been fully engaged in the changing environment, it was identified there was a need to provide processors with advice on options available to respond to the new requirements and positive test results for STECs identified within the US market. Additionally more information was required to examine the new alternatives being applied in the US and to integrate this information into the current AMPC and MLA advice on intervention management for the benefit of Australian exporter registered meat establishments. This project involved a study program for quality assurance and operations managers in the US that included attending the North American Meat Association Conference and liaison with grinding beef supply chains. Participants on the study tour were current US listed beef exporters who co-invested with AMPC and MLA under syndicated PIP arrangements.

This study tour focused on seeking current understanding and industry practice on key interventions, HACCP review requirements and issues relating to STECs that the study program participants sought to examine. These included but were not limited to temperature wash regime of product(s), viscera, and steam sterilisation, application of lactic acid and to investigate the US approach to the issue as part of the study and report on the findings, and identify how this might apply in Australia and what the related considerations are (e.g. costs, practicality, operational or other considerations). The requirement of specific intervention area(s) being identified prior to program commencement ensured participants were working towards the objectives whilst on the study program tour.

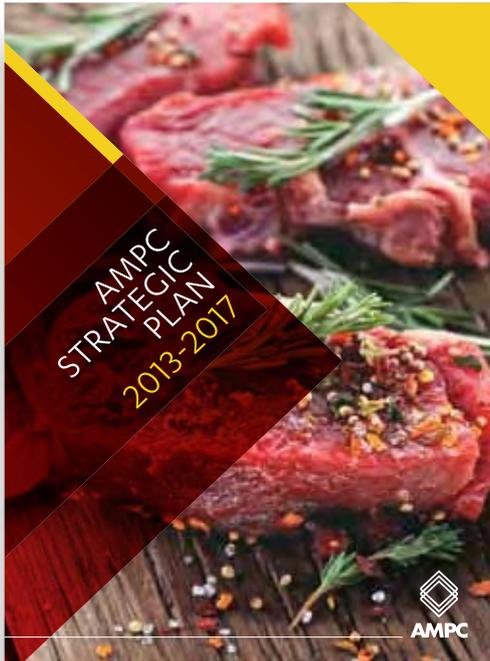
Sheep CRC programs and the CRC supply chain group

Since 2006, AMPC has been working with the Sheep CRC investing in program 3 'Next Generation Meat Quality'. Now in its 7th year, this program is designed to increase the rate of improvement of LMY and meat quality through delivery of genetic and non-genetic tools. These improvements are delivered through specific objectives focussing on LMY, eating quality and nutritional value of lamb and sheep meat. Through the collaborative Sheep CRC partnership, Projects 3.3 (LMY and Supply chains) and 3.4 (Application of Meat Processing Technologies) which underpin program 3 are delivering on these objectives with increases in efficiency and productivity and added value to the red meat processing industry.

There are 3 key projects – lean meat yield and supply chains, application of meat processing technologies and the electrical stimulation work. These are currently ongoing to the completion of the CRC (with AMPC partner commitment support for the life of the CRC). Currently, discussions are underway for the extension of the CRC. Further updates pending outcomes will be available shortly. Current work involves the facilitation of an Industry Supply Chain Officer to help communicate and implement RD&E outcomes of the Sheep CRC to processors and develop better feedback mechanisms to lamb suppliers and producers.

► HIGHLIGHTS GENERAL

AMPC Strategic Plan



Over the next 5 years, the AMPC will potentially make new investments of \$60 million in RD&E and \$33 million in marketing to support a competitive Australian meat processing sector and contribute to the productivity of the broader red meat supply chain.

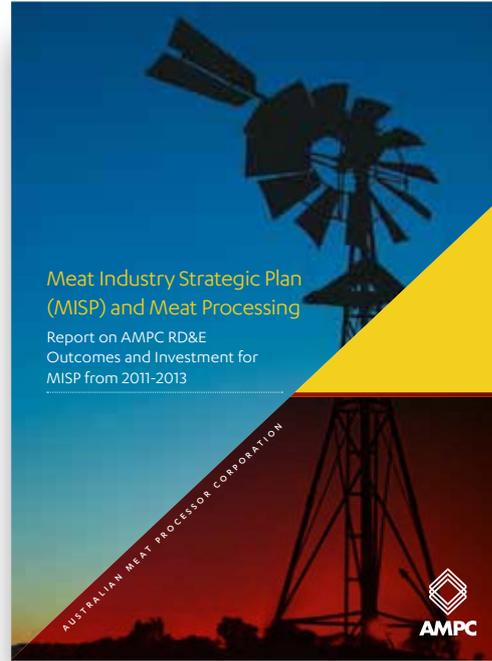
AMPC has worked closely with all stakeholders to identify and define strategic research priorities. AMPC's investments will be guided by the strategic research priorities of the Australian Government and the Australian red meat processing sector and supply chain partners. To identify these priorities, AMPC engaged in and conducted extensive consultation with our membership, Government and key stakeholders. Our primary stakeholders, Australian processing representatives, the Australian Government, MLA and the members of the AMIC, have worked closely with us to identify and define their strategic research priorities.

The new Strategic imperatives represented in the AMPC Strategic RD&E Plan are:

- Enhancing domestic and global competitiveness;
- Delivering to customer and consumers;
- Product integrity, safety and wholesomeness;
- Improving meat processing productivity, products and processes;
- Building capability and influencing practice change.

AMPC looks forward to working with all of our key stakeholders over the next five years to continue strategic investment towards sound, scientific solutions, industry capability building and marketing activities that will contribute to an Australian meat processing sector and broader red meat supply chain that remains profitable, competitive and sustainable.

Meat Industry Strategic Plan (MISP) review



This year AMPC published a report of our meat processing RD&E investments and outcomes against each of the key Meat Industry Strategic Plan imperatives and focus areas. This special evaluation report is available at www.ampc.com.au. This report is one of the evaluation activities undertaken to underpin AMPC's strategic planning process and aligns with the recent initiative of the RMAC, the custodian of the MISP, to evaluate and review the performance of red meat industry service Companies (Rural Research and Development Corporations) and advisory councils against the MISP strategic imperatives. This report provides a summary of AMPC's contribution to the MISP strategic imperatives, and where possible, provides information about the alignment of MISP to AMPC's Strategic Plan and the delivery of RD&E and Marketing activities on behalf of the processing sector.

Australian Livestock Processing Industry Animal Welfare Certification System (AAWCS) and auditor training

Good animal welfare practice is a requirement of customers of the Australian meat and livestock Industry both here in Australia and around the world. Livestock processors and independent retailers, understand this expectation. Processors are committed to the highest level of animal welfare, and humane treatment of livestock.

To help meet this expectation AMPC, in collaboration with the AAMIC and AUS-MEAT Limited has developed the 'Australian Livestock Processing Industry Animal Welfare Certification System' or AAWCS. The AAWCS is an independently audited certification program used by livestock processors to demonstrate compliance with the industry best practice animal welfare standards titled the 'Industry Animal Welfare Standards for Livestock processing Establishments Preparing Meat for Human Consumption' (The Standards). The AAWCS covers all



animal welfare activities at a livestock processing establishment from receipt of livestock at the establishment, to the point of humane processing. The AAWCS has been developed to help Australian processing establishments demonstrate to Industry, Australian and

overseas regulators, and above all customers and consumers of Australian meat products their superior commitment to Industry's best practice animal welfare system.

The AAWCS was developed from the previous project (AMPC, DPI Victoria, the Animal Welfare Science Centre and MLA) which developed the The Standards. These Standards were initially developed in 2005 and revised again in 2009 and 2012. These Standards were developed to meet existing Australian mandatory animal welfare requirements, OIE and published commercial guidelines and provide clear guidelines on how to comply and how to assess compliance with the industry best practice standards. These Standards were developed with the assistance of the AMIC/AMPC Standard Review Committee comprising representatives from science, veterinary policy and practice, animal welfare organisations, Government, regulation and industry.

Animal Welfare Auditor Training (A.MIN.0124)

With the application of the Australian Livestock Processing Industry Animal Welfare Certification System and the related Industry Animal Welfare Standards, there was a need to develop an appropriate auditing guide for industry. Furthermore, given many regulators are currently utilising the original Standards to underpin regulatory enforcement of animal welfare, generic training was also required to enable both industry and government to be asking the same questions and measuring agreed targets. This auditing guide will assist to inform processors conducting internal audits, and other bodies auditing animal welfare at processing sites, how to apply specific criterion appropriately, such as vocalisations. Furthermore, this package will be built on with the specifics required to underpin the new Certification system facilitated by AusMeat (above) that will remain proprietary in nature.

Cross sectoral research

In addition to our close partnership with Meat and Livestock Australia, we invest with other RDCs in cross sectoral collaborative research to deliver RD&E benefits to the industry and broader community. As documented in this Strategic Plan, during the next five years, AMPC expects to continue our investments in cross sectoral research in the following strategic areas, which closely align with the research priorities of our partner RDC organisations:

- › climate change and climate variability;
- › animal biosecurity;
- › water use in agriculture;
- › animal welfare;
- › occupational health and safety;
- › extension, adoption and education.

AMPC's governance and operations are developed in order to seek the best possible efficiency, delivery and return on investment of RD&E funding. AMPC works closely with Meat and Livestock Australia to deliver our RD&E programs in this regard and we align our strategies such that the close collaboration and co-investment is directed at the needs of both processors and the broader supply chain.

Report on the AMPC PIP program

Under the AMPC PIP Program, AMPC allocates 15% (now boosted to 25%) of individual processor levies towards RD&E activities with direct involvement of the processing company and the research provider. This program aims to facilitate adoption of more fundamental research through practical trials in a commercial setting and ensure implementation and capability building in industry.

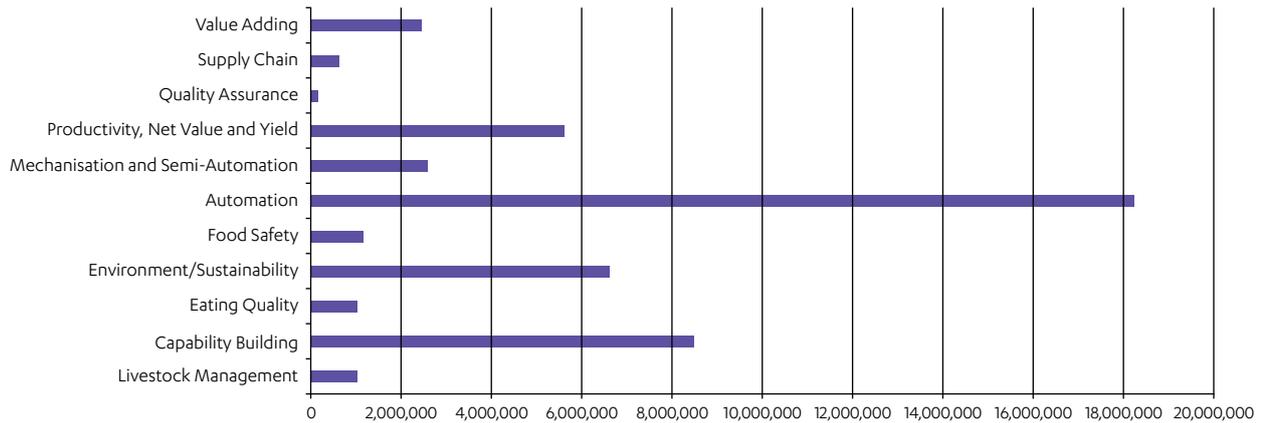
Previous reviews have indicated that industry PIP projects will continue to be strongly subscribed by a diversity of processing companies in both size and species across a broad range of RD&E programs. Particularly, PIP uptake is expected to continue to be in demand, in relation to identified key industry priority areas such as building innovation capability and in the facilitated adoption of emerging technologies.

The AMPC PIP program has shown improvements in the last 2-3 years and is expected to continue to be a highly effective mechanism for leveraging significant private investment directly into industry RD&E programs. Although it is acknowledged that the program occasionally falls short in terms of delivery of these aims to small-medium processing members in areas where capability shortages exist and/or where the issues confronting the processing business may be better addressed or more economically dealt with through other industry RD&E program options.

PIPs from 2009 to 2012 have shown a 10% increase through an analysis of AMPC investment data. This increase in PIP uptake is considered to be in part, driven by the increasing challenges facing processing business and the diversity of these challenges that require specialised RD&E solutions, as well as improved service delivery by AMPC delivered by greater clarity in PIP application processes, liaison with AMPC program team members and industry wide strategic planning. It is considered that the improvements in member investment in PIP RD&E projects has also resulted from increased reporting of RD&E outcomes and priorities by AMPC over the last 2 years.

In general, more members are seeing the benefits of PIPs, with at least 17-22 members taking up PIPs that had not previously (since 2009/2010). There has been more effort towards syndicated (grouped) PIP programs with two major programs launched by AMPC this year, the first being the STEC/E. Coli Study Program in the US and the second being the IFFA program in Germany for processing technologies. The top four areas of investment in the processing sector continue to be changing – with focus on environment and climate change, product development, capability, cost benefit and productivity, where previously automation and food safety remained higher priorities.

Expenditures (2009-2013)



The PIP program is making significant contributions to addressing a wide range of key high priority RD&E needs identified by industry.

In 2012-2013, processors priorities for PIP investment continued in a similar trend, but with greater focus on focus capability building (from 6% to 25%). It is considered that this was due to processors taking advantage of PIP investment to underpin other programs outside of the AMPC portfolio, thereby gaining leverage on their investments (for example the MLA Collaborative Innovation Strategy Program). Overall, PIPs in the area of capability building have increased by 19% from 2009 to 2013. Eating quality, value adding and livestock management remain to be utilising about 2-3% of PIP uptake. Semi-mechanisation investment has reduced slightly and automation investment has increased. This is thought to be due (and in accordance with) the respective priorities and investments made in other AMPC programs on behalf of industry where a greater focus on manual handling solutions is being considered on the basis that other funding programs outside AMPC (such as the MLA Partnerships Program) are more applicable to pure automation investment. One example of the complementarity of these other programs is the ability for voluntary contributions by RD&E and Technology providers directly (through the MLA Donor Company) and the support of

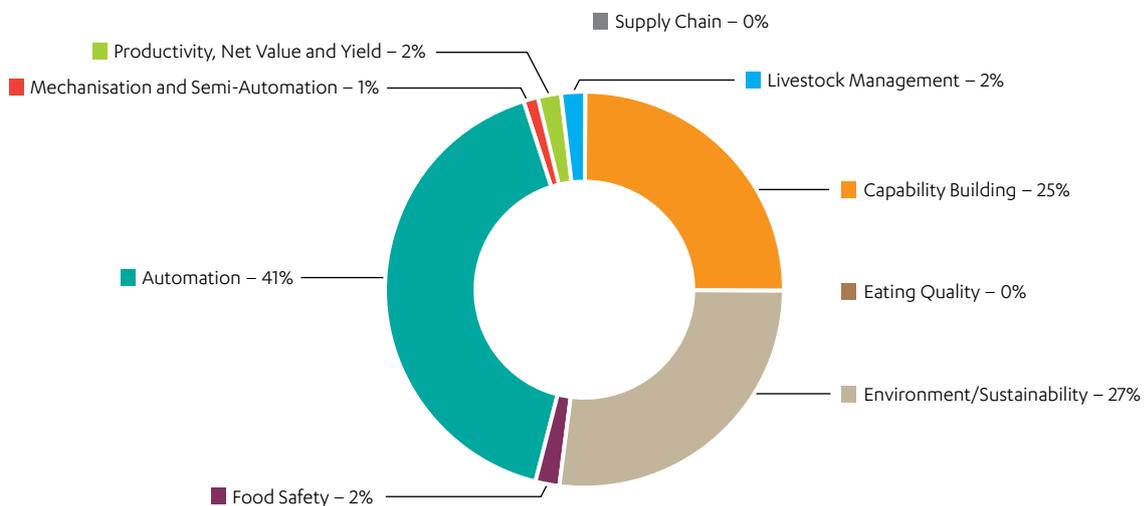
specific and individually designed commercialisation programs for these types of projects. Overall in the PIP program, the quantum of investment increased by 28% since 2009 (to 2013).

Environment and sustainability related projects have remained consistent, given the current investment across the industry in areas such as Clean Technology. AMPC in collaboration with the Australian Government sought support for processors in the form of 1:1 leverage for funding for carbon mitigation (at a quantum of \$53 million matched by both government and industry).

Comparing uptake by species, sheep and lamb are investing more in processing efficiency through automation than beef, an obvious result given the available technologies driven through fundamental RD&E in this space to address labour, WHS, yield requirements and overall processing efficiency. In beef, other challenges facing industry are represented by clear investment in areas such as productivity and value adding for yield improvements, food safety, semi-automation and mechanisation and eating quality.

Importantly, members of all sizes are successfully engaging in the PIP program and through it contributing to the flow on of RD&E benefits to the processing sector, broader industry and wider community. For more information, visit the AMPC web site.

PIP Projects by RD&E Category – FY 2012/13



Directors' Report and Audited Financial Report



DIRECTORS' REPORT

The Directors present their report together with the financial report of the Australian Meat Processor Corporation Ltd for the year ended 30 June 2013 and auditor's report thereon.

Board of Directors

The Directors of the Company in office at the date of this report (or holding office during the year) are:

G HARDWICK, CPA – CHAIRMAN



Gary Hardwick is the Founder and Executive of Hardwicks Meat Works Pty Ltd located in Kyneton, Victoria. Gary is a qualified Accountant, a Member of the Australian Processors Council (APC) and Director and Board Member of Australian Meat Industry Superannuation Trust. Gary is also a member of the Australian Society of Accountants (ASA).

Gary was elected to the AMPC Board for a seventh term in November 2011 and has been Chairman since April 2010.

S J KELLY – DEPUTY CHAIRMAN



Stephen Kelly has been involved in the meat and livestock industries for the past 30 years and is currently General Manager – Industry & Corporate Affairs for Nippon Meat Packers Australia Pty Ltd (NMPA). Stephen has worked for NMPA for the past 17 years in a number of executive and director positions including Sales & Marketing and Group Operations for the company. NMPA own and operate three beef processing plants in Australia, Oakey Abattoir Pty Ltd, Oakey QLD, Thomas Borthwick & Sons, Mackay QLD, and Wingham Beef Exports NSW, and Australia's largest feedlot (Whyalla Feedlot) in Texas QLD. Stephen sits on the AMIC National Export Beef Council and Australian Processor Council, is a Director of Aus-Meat Limited, and a director of National Livestock Identification Scheme.

Stephen was elected to the AMPC Board for a third term in November 2011 and has been Deputy Chairman since April 2010.

J K BERRY – DIRECTOR



John Berry is a Director and Head of Corporate and Regulatory for JBS Australia. He has been in senior corporate roles within the business for over 10 years. John has a Bachelor of Business (Queensland University of Technology) and Master of Business Administration (University of Queensland).

John was elected to the AMPC Board for a third term in November 2011.

B J CAREY – DIRECTOR



Brian Carey is the founder of Food Processing Equipment (FPE). FPE supplies processing equipment to the abattoir industry Australia wide. FPE has a fully functional office in New Zealand with its office in Hamilton. Including Brian's involvement as Director for the Australian

Meat Processor Corporation (AMPC) he is also involved with the Australian Meat Industry Council (AMIC) and holds the position of Chairman for the South Australian Meat Processors Council, is a Member of the National Meat Processors Council and is a Member of the Australian Processor Council.

Brian was elected to the AMPC Board for a second term in November 2011.

D FOOTE – DIRECTOR



David Foote has been in leadership roles across the agribusiness, meat processing and exporting industry for the last 30 years. David joined Australian Country Choice (ACC) in 1999 and has been the Chief Executive Officer since 2002. Headquartered in Brisbane and employing

over 1,000 staff, ACC operates a significant vertically integrated supply chain including a processing facility in Brisbane that incorporates beef slaughter, boning, value-adding and retail ready packing. David represents beef industry interests in his role as a councillor of AMIC's national export beef processor council, Chairman of MLA-South Asia / China's Marketing Taskforce, Chairman of MLA Indonesia Taskforce and Chairman of Export Council of Australia-Agribusiness Advisory Group. In 2010 David was awarded Rural Press Pty Ltd "Beef Achiever of the Year".

David was newly elected to the AMPC Board in November 2011.

DIRECTORS' REPORT

R B JAMES – DIRECTOR



Brian James is a current Director of and is actively involved in Thomas Foods International (TFI) (formerly T&R Pastoral) which owns and operates fully integrated export processing facilities located at Murray Bridge (SA) Lobethal (SA), Tamworth (NSW) and Wallangarra (QLD).

TFI are part owners of HOLCO (SA), a multi state meat, wholesale, retail and food services company. TFI also own part of FOODCOMM INTERNATIONAL, a large meat import and distribution company headquartered on the west coast of the USA.

Brian is a Director of AMIC, Chairman of the National Export Sheep, Lamb and Goat Council, Deputy Chairman of the Australian Processor Council and is actively involved in various other industry committees. Among other qualifications Brian is a member of the Australian Society of Accountants.

Brian was elected to the AMPC Board for a fifth term in November 2011.

R JOHNSON – DIRECTOR



Ray Johnson has combined a research career with high-level business achievement in the agribusiness and retail sectors. Ray graduated in Agricultural Science at Sydney University and then obtained his PhD in Animal Nutrition and Physiology at the University of New

England in Armidale. He was a Senior Research Scientist at the Victorian Department of Agriculture and Rural Affairs and has worked at General Manager/Managing Director level in the Australian animal nutrition, pet food, livestock, livestock genetics and aquaculture feed industries, and as CEO of the NSW Farmers Association. He is currently Managing Director of Agriplacements Australia Pty Ltd, an agribusiness executive search and consulting company. Originally from a farming background at Parkes, Ray is a graduate and member of the Australian Institute of Company Directors.

Ray was elected to the AMPC Board as a Special Qualifications Director in December 2011.

T MAGUIRE – DIRECTOR



Tom Maguire currently holds the position of General Manager- Corporate Affairs and Innovations with Teys Australia Pty Limited. Tom has been involved in the Australian Meat Industry since 1997 and has held senior positions in the Australian Meat Industry Council (AMIC) and

National Meat Association of Australia. Tom is also a member of AMIC's National Export Beef Council and Australian Processor Council. Tom holds post graduate qualifications in Economics, Industrial Relations and Human Resource Management. Tom has also completed a Master's in Business Administration from the University of Queensland.

Tom was elected to the AMPC Board for a third term in November 2011.

P G NOBLE – DIRECTOR



Peter Noble is a Director of family company GM Scott Pty Ltd and he has been involved in the meat industry most of his life. He is a lawyer and has practiced with international law firms in Asia, Australia and the United States. He is presently the Head of Corporate

Governance for a major life insurance company. Peter has degrees in Law and Commerce from the University of NSW. He is also an adjunct Associate Professor in Risk Management at the University of New England.

Peter was elected to the AMPC Board for a second term as Special Qualifications Director in December 2011.

Directors have been in office since the start of the year to the date of this report unless otherwise stated.

DIRECTORS' REPORT

Directors have been in office since the start of the year to the date of this report unless otherwise stated.

Results

The surplus of the Company for the year was \$3,104,153 (2012: \$5,214,935 surplus).

Short and Long Term Objectives

The objectives for which the Company is established are:

- to promote, protect and further the interests of the Company and its Members in any lawful manner;
- to act as an Industry Services Body as declared by the Minister for Primary Industries, including by providing services, and procuring and providing leadership in the provision of services, relating to Research and Development and Marketing in the Meat processing industry for the benefit of its Members, Meat Processors and the community in general;
- where a Statutory Levy Regime applies, enter into a Deed of Agreement or suchlike with the Commonwealth of Australia relating to the payment to, and application of, Funds by the Company;
- to collect payments or Company Contributions from Meat Processors for the purpose of investing in and financing projects, undertakings or enterprises of any kind either severally or jointly with any Meat Industry corporation, body or entity; Research and Development corporation, body or entity; marketing corporation, body or entity; or other person, body or entity; in the interests of and for the benefit of Meat Processors and/or the Meat processing industry;
- to enter into contracts with, and employ and engage, individuals, organisations, companies, bodies or entities to manage, Research and Development and Marketing projects and/or other projects on behalf of the Members and in the interests of and for the benefit of Meat Processors and/or the Meat processing industry; and
- to perform such acts and do any other thing deemed necessary or desirable for the preservation, protection and promotion of the rights and interests of the Members as Meat Processors.

AMPC is responsible to promote:

- freedom of trade in the interests of the Members;
- marketing and sales of Australian Meat on the Australian market and to overseas countries;
- Meat processing industry Research and Development, including;
 - improvement of the quality of Australian Meat;
 - classification of Australian Meat; and
 - the economic, environmental, health, safety and social well being of the Meat processing industry and the wider community;
- the mutual interests of Members by holding conferences, symposiums and seminars for any or all of the Members and presenting the views of the Company on behalf of the Members at any conference, symposium or other forum; and
- the interest of, and do all relevant acts and things for the advancement, protection and promotion of the interests of, the Members.

To achieve these objectives, AMPC consults with its Members, the Commonwealth Government and industry stakeholders and develops, implements and maintains a 3 to 5 year Strategic Plan. AMPC regularly reviews its Strategic Plan in accordance with the requirements set out in the Statutory Funding Agreement with the Commonwealth Government.

Principal Activities

The principal activity of the Company involves the representation of red meat processors, in partnership with Government, and developing and delivering strategic Research and Development investments that are aimed at benefiting industry and the broader community.

AMPC's principle activities are to maximise the efficiency, viability and sustainability of the red meat processing industry by supporting the development of sound, scientific solutions that will:

- improve the long term efficiency and competitiveness of the industry;
- enhance the sustainability of the industry;
- assist to protect, secure and maintain market access;
- enhance capability; and
- enhance the overall productivity and performance of the meat processing sector.

DIRECTORS' REPORT

AMPC engages in extensive consultation with internal and external key stakeholders to develop an understanding of the challenges, drivers and opportunities in the meat processing environment that affect companies, the broader industry and the community. This consultation enables AMPC to establish its strategic imperatives and priorities by which to direct Research and Development and Marketing investment. The Company's Annual Operating Plan (AOP) sets out Marketing and Research & Development activities, expenditure against these activities and Key Performance Indicators (KPIs) for both projects and programs administered each year.

AMPC supports and invests in projects in a wide range of areas, including meat science, automation and technology, environment and sustainability, animal health, welfare and biosecurity, traceability and market access.

Specifically, AMPC focusses on:

- promoting Australian meat in the domestic and international marketplace;
- developing Research and Development initiatives that address issues in meat safety, quality and product integrity, capability, environment, livestock management and other elements of the supply chain; and
- establishing projects and capability that assist in protecting the economic, environmental, health, safety and social wellbeing of the Meat processing industry.

Incorporation

The Company was incorporated as a national Member funded public Company on 22 April 1998 pursuant to reforms announced by the Minister for the Department of Agriculture, Forestry and Fisheries on 18 March 1997.

These reforms required red meat processors and livestock exporters to establish separate self-funded companies to interact with a producer Company through willing partnership arrangements.

In 2007 AMPC, through its processor Peak Industry Council, requested the Australian Government to re-introduce a Statutory levy and that such funds be directed to AMPC to enable it to continue to carry on its normal business activities including its contractual arrangements pursuant to the Memorandum of Understanding referred to below. On 1 September 2007, the Government introduced a Statutory Levy Scheme to collect funds from red meat processors in turn forwarded these funds on to AMPC to manage and fund industry programs.

Memorandum of Understanding

The Company became a party to the Memorandum of Understanding (MOU) on 27 April 1998 and to subsequent revisions to the original document.

The MOU links the Company with Meat and Livestock Australia Limited (MLA) (a separate producer corporation) and LiveCorp (a separate livestock exporter's corporation) together with the Commonwealth of Australia, Peak Industry Councils and the Red Meat Advisory Council.

The roles and responsibilities of the Company under the MOU are:

- a) to provide management, funding and administrative arrangements for red meat processing industry activities to be undertaken by or through MLA including 'Joint Functions', 'Core Functions' and any unforeseen event which has significant impact upon the industry;
- b) in consultation with the Australian Meat Industry Council (AMIC) to undertake activities and provide services on behalf of the processing sector of the industry, which are not inconsistent with the provisions and principles of the MOU;
- c) where services are provided by or through MLA, to develop jointly with MLA and/or AMIC goals for achieving the vision and strategic imperatives for the industry sector it represents;
- d) each year to prepare in consultation with AMIC:
 - i. a strategic plan including financial projections for the period of 3 years beginning on 1 July in that year for the performance of functions necessary to achieve the objects of the Company and consistent with the Meat Industry Strategic Plan ("MISP"); and
 - ii. an operating plan including financial projections setting out the activities the Company proposes to undertake in the immediately following financial year consistent with its business plan;
- e) to pursue the achievement of industry goals identified in the MISP in a manner consistent with policies and strategic imperatives developed pursuant to the MOU and to perform its functions and exercise its powers in a manner consistent therewith; and
- f) to negotiate and enter into contracts with MLA, and with both MLA and LiveCorp, under which MLA will perform, or arrange for other persons to perform, Joint Functions and services on behalf of the industry sectors they represent for achieving the goals identified in the MISP.

DIRECTORS' REPORT

Meetings of Directors

The following table sets out the number of scheduled and urgent unscheduled Directors' meetings (including meeting of Committees of Directors) held during the financial year and

the number of meetings attended by each Director (while they were a Director or Committee Member). During the financial year, eight Board meetings and four Audit & Risk Committee meetings were held.

	DIRECTORS' MEETINGS		AUDIT & RISK COMMITTEE	
	Number eligible to attend	Number attended	Number eligible to attend	Number attended
Directors				
G Hardwick	8	8	–	–
S Kelly	8	8	–	–
J Berry	8	7	–	–
B Carey	8	7	4	3
D Foote	8	8	–	–
R B James	8	5	4	3
R Johnson	8	6	4	4
T Maguire	8	5	–	–
P Noble	8	7	4	4

Auditor's Independence Declaration

A copy of the auditor's declaration under section 307C of the Corporations Act in relation to the audit for the financial year is provided with this report.

Signed in accordance with a resolution of the Board of Directors:



G Hardwick (Chairman)



S Kelly (Deputy Chairman)

Dated: 18th September 2013

CORPORATE GOVERNANCE STATEMENT

CORPORATE GOVERNANCE STATEMENT

The Board of AMPC is responsible, with management, for the corporate governance practices of the Company and constantly updates its practices based on both its advice and its own investigations. This statement sets out the main corporate governance practices that were in operation throughout the financial year, except where otherwise indicated.

The Constitution of the Company was approved by the Members of the Company at a General Meeting held on 14th June 2007 with a high level of support. In part, this was to address the proposed implementation of Statutory levies, which commenced on 1 September 2007.

The Board of Directors

The Board carries out its responsibilities according to the following mandate:

- › the Members elect the Processor Directors every two years;
- › the Special Qualifications Directors are elected by the processor Members of the Board;
- › the Chairman and Deputy Chairman are elected by the Board;
- › the Directors should possess a broad range of skills, qualifications and experience;
- › the Directors are expected to act independently of any associate activities that may cause a conflict;
- › the Board should meet on a regular basis; and
- › all available information in connection with items to be discussed at a meeting of the Board is provided to each Director prior to that meeting.

As at the date of this Directors' report, the Board consisted of seven Processor Directors and two Special Qualifications Directors. Details of the Directors are set out in the Directors' report.

The primary responsibilities of the Board include:

- › the approval of the Annual Operating Plan and the annual financial report;
- › the establishment of the long term goals of the Company and Strategic Plan to achieve those goals;
- › the review and adoption of annual budgets for the financial performance of the Company and monitoring the results on a regular basis;

- › ensuring that the Company has implemented adequate systems of internal controls together with appropriate monitoring of compliance activities, including compliance with the Company's obligations under the Red Meat Industry Memorandum of Understanding and Statutory Funding Agreement; and
- › reporting to Government and the Members.

Independent Professional Advice

With the prior approval of the Chairman, each Director has the right to seek independent legal and other professional advice at the Company's expense concerning any aspect of the Company's operations or undertakings in order to fulfil their duties and responsibilities as a Directors.

Audit & Risk Committee

- › Peter Noble (Chairman)
- › Brian Carey
- › Brian James
- › Ray Johnson

The Audit & Risk Committee meets on at least three occasions in the course of each year.

The Audit and Risk Committee oversight responsibilities include:

- › the preparation and integrity of AMPC's financial accounts and statements;
- › the internal controls, policies and procedures that AMPC uses to identify and manage business risks;
- › the qualifications, independence, engagement, fees and performance of AMPC's external auditor;
- › the external auditor's annual audit of AMPC's financial statements;
- › the resources, performance and scope of AMPC's internal audit function;
- › AMPC's compliance with legal and regulatory requirements and compliance policies; and
- › reviewing and recommending the annual budget to the Board.

CORPORATE GOVERNANCE STATEMENT

The Audit & Risk Committee invites the Chief Executive Officer and Financial & Accounting Manager and may request the external and internal auditors or the Company's legal representatives to attend meetings for the purpose of considering pertinent matters that may arise.

Risk Management

The Board is responsible for the Company's system of internal controls. The Board constantly monitors the operational and financial aspects of the Company's activities and, through the Audit & Risk Committee, the Board considers the recommendations and advice of external and internal auditors and other external advisers on the operational and financial risks that arise or may arise.

The Board ensures that recommendations, and any concerns identified by the external and internal auditors and other external advisers are investigated and, where considered necessary, appropriate action is taken.

In addition, the Board investigates ways of enhancing existing risk management strategies, including appropriate segregation of duties, the employment and training of suitably qualified and experienced personnel, and, in conjunction with the recommendations of the Audit & Risk Committee, the scope and work program of internal auditors.

Remuneration Reviews

The Board acts as a Remuneration Committee and reviews the remuneration policies applicable to all Directors and executive officers on an annual basis with respect to remuneration and terms of employment. Executive remuneration packages, which consist of base salary, fringe benefits, superannuation and entitlements upon retirement or termination, are reviewed with due regard to performance and other relevant factors.

In order to retain and attract executives of sufficient calibre to facilitate the efficient and effective management of the Company's operations, the Board may seek the advice of external advisers in connection with the structure of remuneration packages.

Code of Conduct

As part of the Board's commitment to the highest standard of conduct, the Company has a Code of Conduct to guide executives, management and employees in carrying out their duties and responsibilities. The Code of Conduct includes such matters as:

- › integrity of staff and Directors;
- › information and operational transparency;
- › responsibilities to Members;
- › compliance with laws and regulations;
- › relations with customers and suppliers;
- › ethical responsibilities;
- › employment practices; and
- › responsibilities to the environment and the community.

All Directors are required to declare any conflict of interest, perceived or otherwise, they may have in matters before the Board, not to vote or participate in the debate on matters in which they have a conflict and, where appropriate, to absent themselves from the meeting during the discussion and vote on that issue.

AUDITOR'S INDEPENDENCE DECLARATION

For the financial year ending 30 June 2013



AUDITOR'S INDEPENDENCE DECLARATION

To the Directors of Australian Meat Processor Corporation Ltd

Auditor's Independence Declaration under section 307C of the Corporations Act 2001

In accordance with section 307C of the Corporations Act 2001, I am pleased to provide the following declaration of independence to the Directors of Australian Meat Processor Corporation Ltd.

As lead audit partner for the audit of the financial statements of Australian Meat Processor Corporation Ltd for the financial year ended 30 June 2013, I declare that, to the best of my knowledge and belief, there have been no contraventions of:

- a) the auditor independence requirements of the Corporations Act 2001 in relation to the audit; and
- b) any applicable code of professional conduct in relation to the audit.

Yours sincerely

Nexia Court & Co

Chartered Accountants

Lester Wills

Partner

Dated: 18th September 2013

Sydney Office

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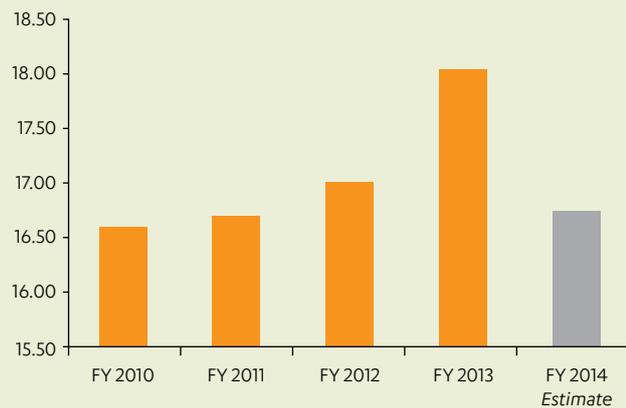
Nexia Court & Co (ABN 71 502 156 733) is an independent New South Wales firm of chartered accountants using the Nexia International trademark under licence. It is affiliated with, but independent from, Nexia Australia Pty Ltd, which is a member of Nexia International, a worldwide network of independent accounting and consulting firms. Neither Nexia International nor Nexia Australia Pty Ltd provide services to clients. Liability limited by a scheme approved under Professional Standards Legislation other than for the acts or omissions of financial services licensees.

AMPC KEY FINANCIAL DATA

For the financial year ending 30 June 2013

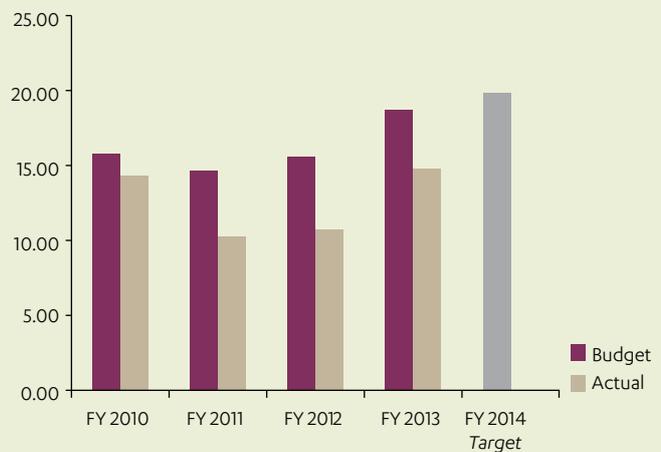
Statutory Levy	\$m
FY 2010	16.61
FY 2011	16.71
FY 2012	17.03
FY 2013	18.06
FY 2014 Estimate	16.75

Statutory Levy (\$m)



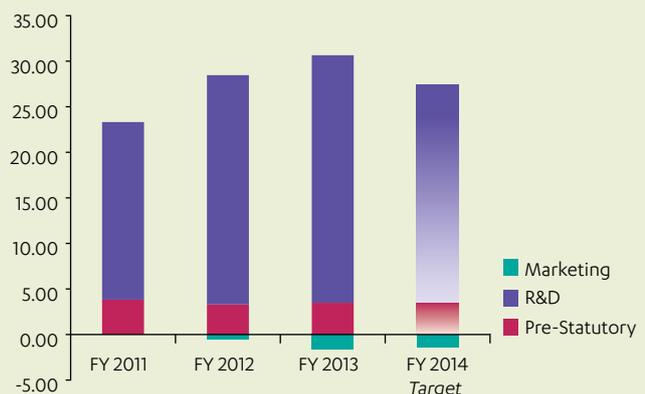
Project expenditure	Budget \$m	Actual \$m
FY 2010	15.72	14.17
FY 2011	14.90	10.98
FY 2012	15.69	11.81
FY 2013	18.72	14.76
FY 2014 Target	19.79	

Project Expenditures (\$m)



AMPC Accumulated Funds	Pre-Statutory \$m	R&D \$m	Marketing \$m	Total \$m
FY 2011	3.89	19.19	0.00	23.08
FY 2012	3.49	25.41	-0.49	28.41
FY 2013	3.59	28.48	-1.88	30.19
FY 2014 Target	3.59	25.63	-1.44	27.78

AMPC Accumulated Funds (\$m)

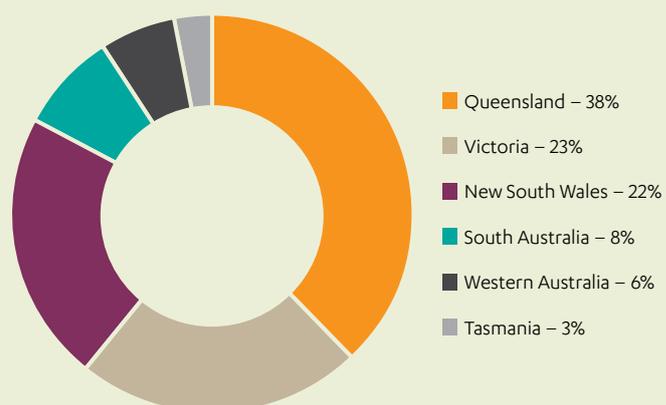


AMPC KEY FINANCIAL DATA

For the financial year ending 30 June 2013

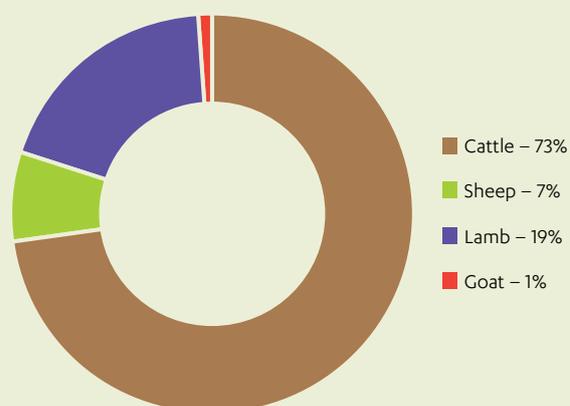
Statutory Levy by State	2011 \$m	2012 \$m	2013 \$m	Movement
Queensland	5.79	6.62	6.29	-5.1%
Victoria	4.17	3.77	3.88	3.1%
New South Wales	3.76	3.79	3.73	-1.6%
South Australia	1.27	1.37	1.35	-0.8%
Western Australia	1.26	1.03	1.05	1.3%
Tasmania	0.45	0.42	0.45	7.0%

Statutory Levy by State



Statutory Levy by Species	2011 \$m	2012 \$m	2013 \$m	Movement
Cattle	12.74	12.92	11.35	-12.2%
Sheep	0.84	0.84	1.08	28.4%
Lamb	2.94	3.06	2.88	-5.9%
Goat	0.18	0.19	0.20	6.7%

Statutory Levy by Species



STATEMENT OF PROFIT AND LOSS AND OTHER COMPREHENSIVE INCOME

For the financial year ending 30 June 2013

	NOTES	2013	2012
		\$	\$
Revenue	3	19,989,517	19,042,990
Employee benefits expense		(1,131,847)	(904,992)
Depreciation and amortisation expenses	4	(32,410)	(35,163)
Program expenditure		(14,757,337)	(11,813,486)
Industry support expenditure		(550,000)	(550,000)
Other expenses		(413,770)	(524,414)
		<u>(16,885,364)</u>	<u>(13,828,055)</u>
Surplus for the year		<u>3,104,153</u>	<u>5,214,935</u>
Other comprehensive income		<u>–</u>	<u>–</u>
Total comprehensive income for the year		<u>3,104,153</u>	<u>5,214,935</u>

The accompanying notes form part of these financial statements

STATEMENT OF FINANCIAL POSITION

For the financial year ending 30 June 2013

	NOTES	2013	2012
		\$	\$
CURRENT ASSETS			
Cash and cash equivalents	6	35,936,445	30,504,690
Trade and other receivables	7	1,769,917	1,947,028
Total Current Assets		37,706,362	32,451,718
NON-CURRENT ASSETS			
Plant and equipment	8	16,134	40,042
Total Non-Current Assets		16,134	40,042
Total Assets		37,722,496	32,491,760
CURRENT LIABILITIES			
Trade and other payables	9	7,400,265	5,278,183
Provisions	10	78,193	71,197
Total Current Liabilities		7,478,458	5,349,380
NON-CURRENT LIABILITIES			
Provisions	10	38,180	40,675
Total Non-Current Liabilities		38,180	40,675
Total Liabilities		7,516,638	5,390,055
Net Assets		30,205,858	27,101,705
EQUITY			
Pre-Statutory accumulated funds	17 (a)	3,589,745	3,487,476
Statutory R&D accumulated funds	17 (b)	28,484,053	24,573,916
Statutory Marketing accumulated funds	17 (c)	(1,867,940)	(959,687)
Total Equity		30,205,858	27,101,705

The accompanying notes form part of these financial statements

STATEMENT OF CHANGES IN EQUITY

For the financial year ending 30 June 2013

	2013	2012
	\$	\$
Total equity at the beginning of the financial year	27,101,705	21,886,770
Total comprehensive income for the year	3,104,153	5,214,935
Total equity at the end of the financial year	<u>30,205,858</u>	<u>27,101,705</u>

STATEMENT OF CASH FLOWS

For the financial year ending 2013

	NOTES	2013	2012
		\$	\$
CASH FLOW FROM OPERATING ACTIVITIES			
Receipts from Commonwealth Government funding		19,959,663	18,726,609
Payments to suppliers and employees		(16,055,017)	(15,039,981)
Interest received		1,529,833	1,615,118
Net cash provided by operating activities		<u>5,434,479</u>	<u>5,301,746</u>
CASH FLOW FROM INVESTING ACTIVITIES			
Proceeds from sale of property, plant and equipment		–	9,936
Payment for property, plant and equipment		(2,724)	(21,638)
Net cash provided by/(used in) investing activities		<u>(2,724)</u>	<u>(11,702)</u>
CASH FLOW FROM FINANCING ACTIVITIES			
Net cash provided by/(used in) financing activities		<u>–</u>	<u>–</u>
Net increase in cash held		5,431,755	5,290,044
Cash and cash equivalents at beginning of financial year		30,504,690	25,214,646
Cash and cash equivalents at end of financial year	6	<u>35,936,445</u>	<u>30,504,690</u>

The accompanying notes form part of these financial statements

NOTES TO THE FINANCIAL STATEMENTS

For the financial year ending 30 June 2013

NOTE 1: STATEMENT OF SIGNIFICANT ACCOUNTING POLICIES

The financial report is a general purpose financial report that has been prepared in accordance with Accounting Standards – Reduced Disclosure Requirements, Accounting Interpretations and other authoritative pronouncements of the Australian Accounting Standards Board and the Corporations Act 2001.

The financial report is for the entity Australian Meat Processor Corporation Ltd as an individual entity. Australian Meat Processor Corporation Ltd is a Company limited by guarantee, incorporated and domiciled in Australia.

The principal accounting policies adopted in the preparation of the financial statements are set out below. These policies have been consistently applied to all the years presented, unless otherwise stated.

NEW, REVISED OR AMENDED ACCOUNTING STANDARDS AND INTERPRETATIONS ADOPTED

The Company has adopted all of the new, revised or amending Accounting Standards and Interpretations issued by the Australian Accounting Standards Board ('AASB') that are mandatory for the current reporting period.

Any significant impact on the accounting policies of the Company from the adoption of these Accounting Standards and Interpretations are disclosed in the relevant accounting policy.

CHANGE IN ACCOUNTING POLICY

As well as the adoption of the new, revised or amended Accounting Standards and Interpretations, the Company has adopted a voluntary change in the accounting policy which has had an effect on the current and prior period. The Company now recognises revenue from the Government in the period that the Government collected the levy.

In previous periods the Company recognised revenue in the period the Government raised the levy, which was 28 days prior to when the payment is due and 35 days prior to forwarding the funds to AMPC. The Company has changed the accounting policy to remove uncertainty from the revenue and therefore improve the overall reliability of the financial information. The impact of the change on the prior year figures was a decrease in revenue of \$113,814, a decrease in levies receivable of \$1,307,888 and a decrease in total equity of \$1,194,073.

(A) BASIS OF PREPARATION OF THE FINANCIAL REPORT

Historical Cost Convention

The financial report has been prepared under the historical cost convention, as modified by revaluations to fair value for certain classes of assets as described in the accounting policies.

(B) REVENUE

Revenue from the Government is recognised in the period that the Government collected the levy.

Other revenue is recognised when the right to receive the revenue has been established.

All revenue is stated net of the amount of goods and services tax (GST).

(C) PLANT AND EQUIPMENT

Each class of plant and equipment is carried at cost or fair value less, where applicable, any accumulated depreciation.

Plant and Equipment

Plant and equipment is measured on the cost basis.

The carrying amount of plant and equipment is reviewed annually by Directors to ensure it is not in excess of the recoverable amount from those assets. The recoverable amount is assessed on the basis of the expected net cash flows which will be received from the assets employment and subsequent disposal. The expected net cash flows have been discounted to present values in determining recoverable amounts.

Depreciation

The depreciable amount of all fixed assets are depreciated over their estimated useful lives to the Company commencing from the time the asset is held ready for use.

The depreciation rates used for each class of assets are:

Class of fixed asset	Depreciation rates	Depreciation basis
Office Equipment	20-25%	Straight Line
Furniture, Fixtures and Fittings	20-25%	Straight Line
Computer Equipment	40%	Straight Line

NOTES TO THE FINANCIAL STATEMENTS

For the financial year ending 30 June 2013

NOTE 1: STATEMENT OF SIGNIFICANT ACCOUNTING POLICIES continued

Leases

Leases are classified at their inception as either operating or finance leases based on the economic substance of the agreement so as to reflect the risks and benefits incidental to ownership.

Finance Leases

Leases of fixed assets, where substantially all the risks and benefits incidental to the ownership of the asset, but not the legal ownership, are transferred to the Company are classified as finance leases. Finance leases are capitalised, recording an asset and a liability equal to the present value of the minimum lease payments, including any guaranteed residual values. Leased assets are depreciated on a straight line basis over their estimated useful lives where it is likely that the Company will obtain ownership of the asset, or over the term of the lease. Lease payments are allocated between the reduction of the lease liability and the lease interest expense for the period.

Operating Leases

Lease payments for operating leases, where substantially all the risks and benefits remain with the lessor, are charged as expenses in the periods in which they are incurred.

Lease incentives received under operating leases are recognised as a liability. Lease payments received reduced the liability

(D) INCOME TAX

The entity is exempt from income tax under the provisions of Section 50(40) of the Australian Income Tax Assessment Act 1997.

(E) EMPLOYEE BENEFITS

Liabilities arising in respect of wages and salaries, annual leave, sick leave and any other employee benefits expected to be settled within twelve months of the reporting date are measured at their nominal amounts based on remuneration rates which are expected to be paid when the liability is settled. All other employee benefit liabilities are measured at the present value of the estimated future cash outflow to be made in respect of services provided by employees up to the reporting date.

Contributions made by the Company to an employee superannuation fund are recognised in the Statement of Financial Position as a liability, after deducting any contributions already paid and in the Statement of Comprehensive Income

as an expense as they become payable. Prepaid contributions are recognised as an asset to the extent that a cash refund or a reduction in the future payment is available.

(F) IMPAIRMENT OF ASSETS

Assets with an indefinite useful life are not amortised but are tested annually for impairment in accordance with AASB 136. Assets subject to annual depreciation or amortisation are reviewed for impairment whenever events or circumstances arise that indicate that the carrying amount of the asset may be impaired. An impairment loss is recognised where the carrying amount of the asset exceeds its recoverable amount. The recoverable amount of an asset is defined as the higher of its fair value less costs to sell and value in use.

(G) COMPARATIVE FIGURES

Where required by Accounting Standards comparative figures have been adjusted to conform with changes in presentation for the current financial year.

(H) FINANCIAL INSTRUMENTS

Classification

The Company classifies its financial instruments in the following categories: financial assets at fair value through profit and loss, loans and receivables, held-to-maturity investments, and available-for-sale financial assets. The classification depends on the purpose for which the investments were acquired. Management determines the classification of its investments at initial recognition and re-evaluates this designation at each reporting date.

Held-to-maturity investments

Fixed term investments with an intention to be held to maturity are classified as held-to-maturity investments. They are measured at amortised cost using the effective interest rate method.

Loans and receivables

Loans and receivables are non-derivative financial assets with fixed or determinable payments that are not quoted in an active market. They are measured at fair value at inception and subsequently at amortised cost using the effective interest rate method.

Non-interest bearing loans and receivables are designated as receivable 'at call' and are therefore recognised at their face value at inception.

NOTES TO THE FINANCIAL STATEMENTS

For the financial year ending 30 June 2013

NOTE 1: STATEMENT OF SIGNIFICANT ACCOUNTING POLICIES continued

Financial liabilities

Financial liabilities include trade payables, other creditors and loans from third parties, including inter-Company balances and loans from, or other amounts due to, Director-related entities.

Non-derivative financial liabilities are recognised at amortised cost, comprising original debt less principal payments and amortisation.

Non-interest bearing loans and payables are payable on demand and are therefore recognised at their face value at inception.

(I) INVESTMENT IN AUS-MEAT LIMITED

AUS-MEAT Limited ("AUS-MEAT") was incorporated on 17 June 1998, and the Company is one of two Members of AUS-MEAT. As AUS-MEAT is a tax exempt public Company limited by guarantee, it cannot distribute its surpluses to its Members; however, upon the event of the wind up of AUS-MEAT, the entity would be entitled to receive 50% of the net assets of AUS-MEAT. As there is no right by the entity to participate in a share of the ongoing results of AUS-MEAT, the use of equity accounting is not appropriate. Therefore, the equity accounting requirements of AASB 128 have not been applied. Details of the investment in AUS-MEAT are included in Note 15 to the financial statements.

(J) CASH AND CASH EQUIVALENTS

Cash and cash equivalents includes cash on hand, deposits held at call with financial institutions, other short-term and highly liquid investments with original maturities of three months or less that are readily convertible to known amounts of cash, which are subject to an insignificant risk of change in value.

(K) TRADE AND OTHER RECEIVABLES

Trade and other receivables are recorded at amounts due less any allowance for doubtful debts.

(L) TRADE AND OTHER PAYABLES

Trade and other payables are recognised when the entity becomes obliged to make future payments resulting from the purchase of goods and services.

(M) PROVISIONS

Provisions are recognised when the entity has a present obligation, the future sacrifice of economic benefits is probable, and the amount of the provision can be measured reliably.

When some or all of the economic benefits required to settle a provision are expected to be recovered from a third party, the receivable is recognised as an asset if it is probable that recovery will be received and the amount of the receivable can be measured reliably.

The amount recognised as a provision is the best estimate of the consideration required to settle the present obligation at reporting date, taking into account the risks and uncertainties surrounding the obligation. Where a provision is measured using the cash flows estimated to settle the present obligation, its carrying amount is the present value of those cash flows.

(N) PLANT INITIATED PROJECTS (PIP) PROGRAM

Statutory Levies

Of the total levies received during the financial year, 25 percent is available to support Research & Development programs initiated by Members through the Plant Initiated Project program.

Liability

The amount recognised as a liability for Plant Initiated Research & Development Programs is the amount of the reserved contributions that have been allocated to approved projects. The liability is treated as a payable under trade and other payables in the financial statements.

Plant Initiated Projects with funding allocations are considered to be active until the Member notifies AMPC of completion or termination, at which point AMPC will derecognise the project liability and write back any remaining funds belonging to the project.

(O) GOODS AND SERVICES TAX

Revenue, expenses and assets are recognised net of the amount of goods and services tax (GST), except where the amount of GST incurred is not recoverable from the taxation authority. In these circumstances, the GST is recognised as part of the cost of acquisition of the asset or as part of the expense.

NOTES TO THE FINANCIAL STATEMENTS

For the financial year ending 30 June 2013

NOTE 1: STATEMENT OF SIGNIFICANT ACCOUNTING POLICIES continued

Receivables and payables are stated with the amount of GST included. The net amount of GST recoverable from, or payable to, the Australian Taxation Office (ATO) is included as a current asset or liability in the statement of financial position.

Cash flows are included in the Statement of Cash Flows on a gross basis. The GST components of cash flows arising from

investing and financing activities which are recoverable from, or payable to, the ATO are classified as operating cash flows.

(P) AUTHORISATION FOR ISSUE

The financial report was authorised for issue on 18 September 2013 by the Board of Directors.

NOTE 2: CRITICAL ACCOUNTING ESTIMATES AND JUDGEMENTS

Estimates and judgements are based on past performance and management's expectation for the future.

CRITICAL ACCOUNTING ESTIMATES AND ASSUMPTIONS

The Company makes certain estimates and assumptions concerning the future, which, by definition will seldom

represent actual results. No estimates and assumptions could have a material impact on the assets and liabilities in the next financial year, other than those disclosed elsewhere in the financial report.

NOTE 3: REVENUE

	NOTES	2013	2012
		\$	\$
OPERATING ACTIVITIES			
- Government funds		18,059,104	16,917,528
- interest		1,522,933	1,587,865
- reversal of non aligned provisions	12	337,329	433,300
- litigation recovery		-	62,940
- net gain on disposal of plant and equipment		-	9,032
- other income		70,151	32,325
Total revenue		19,989,517	19,042,990

NOTES TO THE FINANCIAL STATEMENTS

For the financial year ending 30 June 2013

NOTE 4: SURPLUS FOR THE YEAR

	2013	2012
	\$	\$
Surplus for the year has been determined after:		
Depreciation of non-current assets		
- motor vehicles	–	3,620
- office equipment	1,456	4,142
- furniture, fixtures and fittings	19,465	18,958
- computer equipment	11,489	8,443
Depreciation of plant and equipment	32,410	35,163
Remuneration of the auditors for:		
- audit and review services	27,000	27,000
- other services	–	–
- other services to related practices of the auditor	–	–
	27,000	27,000
Net loss on disposal of non-current assets		
- Property, plant and equipment	–	–

NOTE 5: KEY MANAGEMENT PERSONNEL COMPENSATION

	2013	2012
	\$	\$
Compensation received by key management personnel of the Company:		
Directors		
- Short-term benefits (Directors Fees)	274,000	244,340
- Post-Directorship benefits (Superannuation)	24,660	21,990
	298,660	266,330
Executives		
- Short-term employee benefits (Salary)	174,484	160,909
- Post-employment benefits (Superannuation)	15,704	14,482
- Other long term benefits (Long Service Leave)	–	–
- Termination benefits	–	–
	190,188	175,391
	488,848	441,721

NOTES TO THE FINANCIAL STATEMENTS

For the financial year ending 30 June 2013

NOTE 5: KEY MANAGEMENT PERSONNEL COMPENSATION continued

THE NAMES OF DIRECTORS WHO HAVE HELD OFFICE DURING THE YEAR (AND INCLUDED AS KEY PERSONNEL IN ADDITION TO CEO) ARE:

G Hardwick	B Carey	R Johnson
S Kelly	D Foote	T Maguire
J Berry	R B James	P Noble

Total aggregated out of pocket costs including travel and related expenses incurred by Directors during the year was \$87,130.

NOTE 6: CASH AND CASH EQUIVALENTS

	2013	2012
	\$	\$
Cash on hand	–	500
Cash at bank	2,585,054	5,676,956
Cash on term deposit	33,351,391	24,827,234
	35,936,445	30,504,690

NOTE 7: TRADE AND OTHER RECEIVABLES

	2013	2012
	\$	\$
Current		
Trade receivables	1,112,483	1,284,384
Other receivables	657,434	662,644
	1,769,917	1,947,028

NOTES TO THE FINANCIAL STATEMENTS

For the financial year ending 30 June 2013

NOTE 8: PLANT AND EQUIPMENT

	2013	2012
	\$	\$
Office equipment		
At cost	8,732	21,213
Less accumulated depreciation	(8,732)	(19,756)
	–	1,457
Furniture, fixtures and fittings		
At cost	121,035	121,034
Less accumulated depreciation	(121,035)	(101,570)
	–	19,464
Computer equipment		
At cost	38,562	32,386
Less accumulated depreciation	(22,428)	(13,265)
	16,134	19,121
Total plant and equipment	16,134	40,042

(A) MOVEMENTS IN CARRYING AMOUNTS

Movement in the carrying amounts for each class of plant and equipment between the beginning and the end of the current financial year.

	Office equipment	Furniture, fixtures & fittings	Computer equipment	Total
	\$	\$	\$	\$
2013				
Balance at the beginning of the year	1,456	19,465	19,121	40,042
Additions	–	–	8,502	8,502
Disposals	–	–	–	–
Depreciation expense	(1,456)	(19,465)	(11,489)	(32,410)
Carrying amount at end of the year	–	–	16,134	16,134

NOTES TO THE FINANCIAL STATEMENTS

For the financial year ending 30 June 2013

NOTE 9: TRADE AND OTHER PAYABLES

	NOTES	2013	2012
		\$	\$
CURRENT			
Unsecured liabilities			
Trade payables		3,077,585	2,269,701
Plant initiated projects	12	1,543,669	1,024,400
Other program payables		2,745,871	1,951,855
Sundry payables and accruals		33,140	32,227
		7,400,265	5,278,183

NOTE 10: PROVISIONS

	2013	2012
	\$	\$
CURRENT		
Employee benefits	78,193	71,197
NON-CURRENT		
Employee benefits	38,180	40,675

NOTE 11: COMPANY DETAILS

The registered office of the Company is:
 Australian Meat Processor Corporation Ltd
 Suite 205, Level 2
 460 Pacific Highway
 St Leonards NSW 2065

NOTES TO THE FINANCIAL STATEMENTS

For the financial year ending 30 June 2013

NOTE 12: PLANT INITIATED PROJECT LIABILITY

	2013	2012
	\$	\$
Opening balance included in payables	1,024,400	1,746,424
Total PIP transactions approved across the whole membership	3,174,678	1,124,143
Reductions arising from payments of approved PIPs	(2,318,080)	(1,412,867)
Reductions resulting from reversal of PIP fundings	(337,329)	(433,300)
Closing balance included in payables	1,543,669	1,024,400

NOTE 13: RELATED PARTY DISCLOSURE

TYPE OF TRANSACTION	TERMS AND CONDITIONS OF TYPE OF TRANSACTION	CLASS OF RELATED PARTY	2013	2012
			\$	\$
Operational and support funding	Normal Commercial terms and conditions	Associate Aus-Meat Ltd	\$550,000	\$550,000

During the period AMPC has approved PIP's for a number of Director-related entities under the PIP program. Under the Company's Constitution, all transactions with Director related entities are on normal commercial terms and are consistent with those provided to all Members.

The following table provides a breakdown of the movement and final balance of PIPs of Director related parties.

	TRANSACTION VALUE YEAR ENDED 30 JUNE		BALANCE OUTSTANDING AT 30 JUNE	
	2013	2012	2013	2012
	\$	\$	\$	\$
Plant Initiated Projects	2,391,114	587,132	1,077,465	329,883

NOTE 14: MEMBERS' LIABILITY

Australian Meat Processor Corporation Ltd is incorporated in New South Wales as a Company limited by guarantee. Under the Company's Constitution, the liability of the governing Members is limited and shall not exceed \$100 on the winding up of the Company.

NOTES TO THE FINANCIAL STATEMENTS

For the financial year ending 30 June 2013

NOTE 15: ASSOCIATED ENTITIES

NAME OF ENTITY	PRINCIPAL ACTIVITY	OWNERSHIP INTEREST 2013	OWNERSHIP INTEREST 2012	CARRYING AMOUNT
Aus-Meat Limited	Services to the Food Industry	50%	50%	Nil

	2013	2012
	\$	\$

Summarised financial position of associate:

Current Assets		
Cash	2,444,609	2,141,737
Receivables	1,132,328	1,366,482
Investments	3,406,429	2,166,840
Other	583,784	728,486
Non Current Assets		
Investments	799,753	630,309
Plant and equipment	3,397,427	3,625,902
Current Liabilities		
Accounts payable	(3,342,132)	(3,376,639)
Non Current Liabilities		
Provisions	(219,544)	(168,496)
Net assets	8,202,654	7,114,621
Net surplus for the period	918,589	987,313
Other comprehensive income	-	-

NOTE 16: ECONOMIC DEPENDENCE

The Company through investment in Research and Development and Marketing, is the custodian for the collection and administration of statutory levies collected from processors by the Commonwealth Government. The expenditure of levies on behalf of industry is conducted in accordance with the Deed of Agreement between AMPC and the Commonwealth Department of Agriculture, Fisheries and Forestry (DAFF). During the first quarter of 2012 AMPC, in collaboration with DAFF, renewed its Deed of Agreement. The new agreement provides a more consistent approach across the Rural Research & Development Corporations.

NOTES TO THE FINANCIAL STATEMENTS

For the financial year ending 30 June 2013

NOTE 17: ACCUMULATED FUNDS

	2013	2012
	\$	\$
(A) PRE STATUTORY FUNDS		
The pre-Statutory funds records the Company's retained surpluses prior to the Statutory Funding Agreement which commenced 1 September 2007:		
Movements during the financial year:		
Opening balance	3,487,476	3,889,111
Allocation of current year surplus/(deficit)	102,269	(401,635)
	<u>3,589,745</u>	<u>3,487,476</u>
(B) STATUTORY RESEARCH & DEVELOPMENT FUNDS		
The Research and Development funds records surpluses contributed by the Research and Development portion of the processor levy in accordance with the Statutory Funding Agreement 2011-15:		
Movements during the financial year:		
Opening balance	24,573,916	18,533,009
Allocation of current year surplus/(deficit)	3,910,137	6,040,907
	<u>28,484,053</u>	<u>24,573,916</u>
(C) STATUTORY MARKETING FUNDS*		
The Marketing funds records surpluses contributed by the Marketing portion of the processor levy in accordance with the Statutory Funding Agreement 2011-15:		
Movements during the financial year:		
Opening balance	(959,687)	(535,350)
Allocation of current year surplus/(deficit)	(908,253)	(424,337)
	<u>(1,867,940)</u>	<u>(959,687)</u>

*The deficit occurred on the basis of the current misalignment in the income split and expenditure split between Research and Marketing funding allocations as detailed in the Company's articles shared with the Commonwealth Government. The split in allocation of funding between Marketing and Research is under discussion with the Commonwealth as part of normal business considerations and amendment will be sought in due course.

NOTES TO THE FINANCIAL STATEMENTS

For the financial year ending 30 June 2013

NOTE 18: ACCUMULATED EXPENSES REGARDING FRAUD

As previously reported, the Company had identified a misappropriation of funds amounting to \$4,261,488 in previous financial years. The Company is actively seeking recoupment of the funds and has incurred legal, forensic accountant and independent expert expenses throughout the process. Below is a reconciliation of the total expenses incurred to balance date in relation to this issue.

	2013	2012
	\$	\$
Opening balance	1,470,379	1,151,233
Incurred in current year *	240,389	319,146
Accumulated expenses incurred to balance date	<u>1,710,768</u>	<u>1,470,379</u>

* Expenses are included in Other Expenses on the face of the Statement of Comprehensive Income

NOTE 19: CONTINGENCIES

Contingent Liabilities

The 25 percent of received levies allocated to the Plant Initiated Project program remains available for three years, after which the commitment lapses. As at 30 June 2013, the total Research and Development funds held in reserve for potential PIPs is \$10.84M (30 June 2012: \$9.43M).

Contingent Assets

The Company is continuing its activities in pursuing its misappropriated funds. The Company will report outcomes against its activities during 2014.

NOTE 20: EVENTS AFTER THE REPORTING PERIOD

On 9 July 2013 the company entered into a new operating lease for a premises located in North Sydney. The lease is for a period of five years commencing 1st September 2013 with an option to extend the lease for a further five years thereafter.

No other matter or circumstance has arisen since 30 June 2013 that has significantly affected, or may significantly affect the Company's operations, the results of those operations or the Company's state of affairs in future financial years.

DIRECTORS DECLARATION

For the financial year ending 30 June 2013

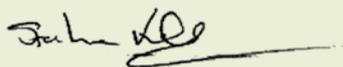
The Directors of the Company declare that:

1. The financial statements and notes, as set out on pages 56 to 80, are in accordance with the Corporations Act 2001 and:
 - (a) comply with Accounting Standards in Australia and the Corporations Regulations 2001; and
 - (b) give a true and fair view of the financial position as at 30 June 2013 and performance for the year ended on that date of the Company.
2. In the Directors' opinion there are reasonable grounds to believe that the Company will be able to pay its debts as and when they become due and payable.

This declaration is made in accordance with a resolution of the Board of Directors.



G Hardwick (Chairman)



S Kelly (Deputy Chairman)

Dated this 18th day of September 2013

INDEPENDENT AUDIT REPORT

For the financial year ending 30 June 2013



AUSTRALIAN MEAT PROCESSOR CORPORATION LTD

ABN 67 082 373 448

INDEPENDENT AUDIT REPORT

TO THE MEMBERS OF

AUSTRALIAN MEAT PROCESSOR CORPORATION LTD

Report on the Financial Report

We have audited the accompanying financial report of Australian Meat Processor Corporation Ltd, which comprises the statement of financial position as at 30 June 2013, the statement of profit and loss and other comprehensive income, statement of changes in equity and cash flows for the year ended on that date, a summary of significant accounting policies, other explanatory notes and the directors' declaration.

Directors' Responsibility for the Financial Report

The directors of the Company are responsible for the preparation of the financial report that gives a true and fair view in accordance with Australian Accounting Standards and the *Corporations Act 2001* and for such internal control as the directors determine is necessary to enable the preparation of the financial report that gives a true and fair view and is free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

Our responsibility is to express an opinion on the financial report based on our audit. We conducted our audit in accordance with Australian Auditing Standards. Those standards require that we comply with relevant ethical requirements relating to audit engagements and plan and perform the audit to obtain reasonable assurance about whether the financial report is free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial report. The procedures selected depend on the auditor's judgement, including the assessment of the risks of material misstatement of the financial report, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the company's preparation of the financial report that gives a true and fair view in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by the directors, as well as evaluating the overall presentation of the financial report.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Independence

In conducting our audit, we have complied with the independence requirements of the *Corporations Act 2001*. We confirm that the independence declaration required by the *Corporations Act 2001* would be in the same terms if it had been given to the directors at the time that this auditor's report was made.

Sydney Office

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INDEPENDENT AUDIT REPORT

For the financial year ending 30 June 2013



Auditor's Opinion

In our opinion:

- (a) the financial report of Australian Meat Processor Corporation is in accordance with the *Corporations Act 2001*, including:
 - (i) giving a true and fair view of the Company's financial position as at 30 June 2013 and of its performance for the year ended on that date; and
 - (ii) complying with Australian Accounting Standards and the *Corporations Regulations 2001*; and

A handwritten signature in blue ink that reads "Nexia Court & Co".

Nexia Court & Co
Chartered Accountants

A handwritten signature in blue ink that reads "Lester Wills".

Lester Wills
Partner

Sydney

Dated: 24th October 2013

LIST OF ACRONYMNS

For the financial year ending 30 June 2013

AAR:	Anaerobic Ammonium Removal
ABARES:	Australian Bureau of Agricultural and Resource Economics and Sciences
AGV:	Automated Guided Vehicle
AL:	Anaerobic Lagoon
AMBR:	Anaerobic Membrane Bioreactor
AMIC:	Australian Meat Industry Council
AMPC:	Australian Meat Processor Corporation
ANAMMOX:	Anaerobic Ammonium Oxidation
ANMBR:	Anaerobic Membrane Bioreactor
ASBV:	Australian Sheep Breeding Values
BOD:	Biological Oxygen Demand
BSA:	Bovine Serum Albumin
CAL:	Covered Anaerobic Lagoon
COD:	Chemical Oxygen Demand
CPM:	Carbon Pricing Mechanism
CS:	Chondroitin Sulphate
CSIRO:	Commonwealth Scientific and Industrial Research Organisation
CT:	Computed Tomography
DAF:	Dissolved Air Flootation
EDC:	Endocrine Disrupting Compound
EEIP:	Energy Efficiency Information Program
E-STIM:	Electrical Stimulation
FIESTA:	Food Innovation: Emerging Technologies and Applications
FSIS:	Food Safety and Inspection Service
FTA:	Free Trade Agreement
FTE:	Full-Time Equivalent
GDP:	Gross Domestic Product
GHG:	Greenhouse Gas
GP:	General Practitioner
HACCP:	Hazard Analysis And Critical Control Point
HGP:	Hormone Growth Promotants
HMEC:	High Moisture Extrusion Cooked
HPP:	High Pressure Processing
HRT:	Hydraulic Retention
HRT:	Hydraulic Retention Time
ICMJ:	Intercollegiate Meat Judging
IGG:	Immunoglobulin G
IMF:	Intramuscular Fat
INF:	Information Nucleus Flock
KPI:	Key Performance Indicator
LAB:	Lactic Acid Bacteria
LPA:	Livestock Production Assurance
LD:	<i>longissimus dorsi</i>

LL:	<i>longissimus et lumborum</i>
LMY:	Lean Meat Yield
MI:	Meat Industry
MINTRAC:	National Meat Industry Training Advisory Council
MISP:	Meat Industry Strategic Plan
MLA:	Meat and Livestock Australia
MOU:	Memorandum of Understanding
MSA:	Meat Standards Australia
NGERS:	National Greenhouse and Energy Reporting Scheme
NIR:	Near Infrared Spectroscopy
NLIS:	National Livestock Identification System
NVD:	National Vendor Declaration
OCM:	Objective Carcase Measurement
PCB:	Polychlorinated Biphenyls
PEF:	Pulsed Electric Field
PIP:	Plant Initiated Project
PR:	Public Relation
PV:	Photovoltaic
PW:	Paunch Waste
QA:	Quality Assurance
RD&E:	Research, Development and Extension
RDC:	Research Development Corporation
RFID:	Radio Frequency Identification
RFP:	Rotary Fan Press
RMAC:	Red Meat Advisory Council
SBR:	Sequencing Batch Reactor
SM:	<i>semimembranosus</i>
SME:	Small-to-Medium Enterprise
SOP:	Standard Operating Procedure
SRT:	Sludge Retention Time
STEC:	Shiga Toxin Producing Escherichia Coli
TBT:	Technical Barriers to Trade
TCOD:	Total Chemical Oxygen Demand
TN:	Total Nitrogen
TP:	Total Phosphate
TPP:	Trans-Pacific Partnership
TVC:	Total Viable Count
UQ:	The University of Queensland
US:	The United States
VFC:	Very Fast Chilling
WHS:	Workplace Health and Safety
WTO:	World Trade Organization



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