

final report

Project code: P.PIP.0316
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Date published: 12th October 2015

PUBLISHED BY
Meat and Livestock Australia Limited
Locked Bag 991
NORTH SYDNEY NSW 2059

TFI Collaborative Innovation System Program Stage 1

Meat & Livestock Australia acknowledges the matching funds provided by the Australian Government to support the research and development detailed in this publication.

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Executive Summary

Thomas Foods International (TFI) began operations in 1988 and has evolved into Australia's largest 100% family owned meat processing company with an annual revenue well in excess of \$1 billion. TFI commenced involvement in the CISP Program in April 2012 and have built a foundation for sustainable practices and plant performance during this period. Throughout the last three years TFI has successfully integrated innovation into its overall business strategy to increase operational excellence (specifically processing efficiency and environmental sustainability). During this time 26 innovation projects have been completed, with a direct benefit to TFI's business realised from 26 completed projects is estimated to \$24,478,000 p.a.

During this period a significant focus has been on increasing operational performance across the group's newly acquired facilities. To facilitate this, an extensive capital works program has been undertaken to achieve industry best practice. Significant achievement has been made in these identified focus areas since the program commenced. The initial innovation program strategic plan provided the foundation for sustainable practices and plant performance.

TFI have also extended their innovation programs strategic focus into the area of lamb supply chain management. This resulted in a specific strategy around improving lamb supply and quality. It is envisaged that this initiative will become the foundation for developing strong supply chain relationships to enhance quality, encourage consistency and ensure customers' expectations are met.

The main benefits to Thomas Foods International arising out of CISP in Stage 1 have included:

- Reduction in costs and increased production efficiencies
- Greater confidence in implementing new technologies
- Ability to adapt to a changing business environment
- Becoming a strategic collaborative partner for the MLA/ CRC lamb supply chain group with the appointment of a lamb supply chain coordinator (Dr Dave Rutley) to develop and implement value chain alignment strategies

Table of Contents

1	Background.....	4
1.1	Thomas Foods International	4
2	Projective Objectives	5
2.1	Review of the Innovation Strategy Goals	5
2.2	The Scope of the Project	5
3	Innovation Achievements	5
4	Review of Focus Areas	10
5	Discussion	10
5.1	Review and Refine Ongoing Program Structure	10
6	Conclusions/Recommendations.....	11
6.1	CISP Stage 2.....	11

1 Background

1.1 Thomas Foods International

In September 2007, Meat & Livestock Australia (MLA) launched the Collaborative Innovation Strategies program (CISp). The program involves the co-development of comprehensive innovation strategies with individual enterprises which meet commercial imperatives in addition to focusing on the implementation of key industry and government innovation priorities.

MLA aims to continue to develop Collaborative Innovation Strategies Program throughout a broad range of companies throughout the Australian red meat industry and its supply chains.

The Collaborative Innovation Strategies Program is a flexible enterprise innovation capability building program that is customised for large and small enterprises throughout the red meat value chain. Enterprise innovation capability within the context of this program is defined as the underlying capacities that enable a firm to be innovative on a sustained basis, rather than producing one-off product innovations from time to time

In April 2012, a 3 year Collaborative Innovation Strategy Program partnership with TFI commenced which transversed the entire organisation , along with the development of both the professional development plan for the innovation manager and a whole of enterprise innovation culture building program with the objective of developing the organisations innovation capability. At the time TFI operated four processing facilities across NSW and SA and also have significant investment in a US distribution business. It was anticipated that through this program, TFI would, amongst other things, develop an improved innovation capability, improve its efficiency of operations, reduce its cost of production and increase the value of its products. The Collaborative Innovation Strategy Program was delivered through three contractual schedules:

- Schedule 1: Collaborative Innovation System
- Schedule 2: Innovation Manager's Professional Development
- Schedule 3: Enterprise Innovation Culture Building Program

2 Projective Objectives

2.1 Review of the Innovation Strategy Goals

The development of an innovation system which supports and embeds the innovation strategy within TFI was a major component of this project. This innovation system was to include the use of a number of innovation enablers such as innovation diagnostics, innovation management systems and effective change management. Further, the resources required to embed innovation throughout the business and the portfolio of projects that will assist in demonstrating the value of innovation were to be identified. Ultimately, the goal of this project was to integrate innovation into the way that TFI operates by developing a well managed innovation system that can deliver increased profitability and sustainability to the business.

2.2 The Scope of the Project

The scope of the innovation system was quite broad and included initiatives in the areas of:

- understanding the value of innovation to TFI and what innovation can add to the bottom line;
- identify the resources that will be required to assist in embedding innovation in the way TFI does business;
- identify the enablers that will assist in developing an innovation capability;
- identify the portfolio of projects that will assist in demonstrating the value of innovation, in areas such as, new products and markets;
- development and/or adoption of new technologies and production processes;
- application of new science and knowledge;
- new business systems and models (e.g. value chain innovation; new strategic alliances);
- organisational culture and capability, particularly in the area of building innovation capability.

3 Innovation Achievements

Enterprise innovation capability within the context of this program is defined as the underlying capacities that enable a firm to be innovative on a sustained basis, rather than producing one-off product innovations from time to time. Measureable performance indicators identify the contribution of innovation capability to TFI's achievement of key business objectives. The TFI innovation journey has included both collaborative project in the form of PIPs and PSHs as well as a significant number of company initiated and run projects, a list of which can be seen below. Ultimately the innovation capability building program is expected to contribute to TFI's long term profitability, competitiveness and sustainability.

To ensure the successful implementation of TFIs Innovation Strategy a dedicated Innovation Manager (IM) was employed. The main focus of the IM was to implement and manage TFIs Innovation Strategies across the TFI business. The IM was also responsible for coordinating the process and product focus areas of TFIs Innovation Strategy. The success of TFIs Innovation Strategy and the dedicated IM can easily be seen through the number of projects undertaken and the return on investment to TFI.

P.PIP.0293 - Design and Optimisation of Purpose Built CAL

This project reports on the design of the first purpose built High Rate Covered Anaerobic Lagoon (CAL) for a mixed beef and sheep abattoir at Murray Bridge in South Australia. The design took into consideration a key limitation for Australian meat processors, being space. This concept pioneered the design of low cost, low energy, high efficiency treatments systems for the red meat industry. The final design includes two, 20 ML CALs that are operated in parallel, treating a design flow of 3.14 ML/day. The design organic loading rate is 0.54 kgCOD/m³/day with a hydraulic residence time of 13 days. The design is expected to achieve 80% BOD reduction.

The CALs are gradually stabilising and trending towards the design objectives; achieving 72% BOD reduction as at the end of April 2013. The average biogas production through March 2013 was 0.52 m³ per kg of COD removed with the average methane content of the biogas being 55%. By June 2014 the CALs were achieving a 90% reduction in COD and producing over 10,000m³ of biogas per day with 65% methane content.

P.PIP.0340 Manipulation of Wastewater Treatment System to maximize biogas production

This project explored the manipulation of the newly constructed waste water treatment system at TFI Murray Bridge to maximize bio-gas production from the existing covered anaerobic lagoons (CAL) for future use in on-site energy generators. It included analysis of loading rate, flow rate, and loading composition of waste water into the CAL system. The project engaged industry experts to assist in establishing a program of trials and to monitor the loading to and the greenhouse gas generation from the pond. Also included in the project was a cost benefit analysis of construction of CAL and biogas capture and reuse.

P.PIP.0347 - Gas consumption reduction in rendering plant at TFI Murray Bridge

This project provides a holistic/systems approach to improving efficiency of a processor rendering plant through methane capture and drying and dewatering technologies. The study addressed feasibility, design and costing for the improvement of an existing rendering plant at TFI, Murray Bridge, but did not include capital expenditure. The project involved detailed research into the current rendering plant at Murray Bridge to ascertain how the efficiency of the existing rendering process could be improved. The project provided a detailed examination of a number of different process elements to identify value-add and energy saving opportunities, e.g. the cooking process, meat meal milling and handling, installation of new blood drying processing equipment, the odour management system and the existing boiler arrangement with the view to replace the existing boiler system with new higher-efficiency dual-fuel boilers fuelled in part by biogas captured from the on-site covered

anaerobic lagoon (CAL) waste water treatment system. The final report explains the benefits of each process element to encourage adoption by industry.

P.PIP.0397 - Reduced wastewater treatment costs through smart stream segregation & treatment for sewer discharge

Chemically-dosed DAF technology is used in the Australian and world-wide meat industry to treat wastewater to achieve compliance with sewer limits. The technology is relatively straightforward, compact and fast acting. In recent times, DAFs with improved design have emerged (second generation) which incorporate plate packs for faster separation (hence cheaper units) and dewatering grids for drier sludge (reduced sludge transport or reuse costs). However, information regarding their actual on-site performance on a range of waste streams is lacking. More data is needed however across a range of other types of meat plant (e.g. sheep) and waste streams (such as those in this project proposal) to assist in the integration of these DAFs into abattoir wastewater treatment. This project collected high quality data on the performance of the newer second generation DAFs at Thomas Foods International Tamworth facility and performed a before and after comparison of operating costs to evaluate the benefits.

P.PIP.0448 - Spray cabinet E. Coli intervention project to maintain market access to US and other markets

Thomas Foods International is seeking to safeguard their export market access and increase their market competitiveness by reducing the risk of STEC E. Coli contamination. This project will trial the effectiveness of applying twin oxide to cattle on the slaughter chain while the animals hide remains on the animal within a specially designed and built carcass cabinet within the Murray Bridge processing facility as a management process to safeguard exports against E. Coli contamination within the context of a large scale Australian beef processing facility. The project aims to improve application coverage, residence time and ensure each carcass is treated through an automated system. This reduces the WHS implications associated with twin oxide and removes the risk of operator error when applying the intervention.

A third party, being the University of Adelaide will be conducting the validation studies and residual contamination studies to ensure the system is both effective and doesn't create product contamination issues. The project includes varying types/breeds of cattle to validate the effectiveness of proposed system

P.PIP.0449 - Trim auger spray E. coli intervention project to maintain market access to US and other markets

Thomas Foods International is seeking to safeguard their export market access and increase their market competitiveness by reducing the risk of STEC E. Coli contamination. This project will trial the effectiveness of applying twin oxide to trim within a specially designed and built auger system. Located at the Murray Bridge processing facility this intervention process seeks to safeguard exports against E. Coli contamination within the context of a large scale Australian meat processing facility.

The auger system will need to be designed and constructed to ensure that all trim passing through the auger process makes the required contact with the product being applied to have a significant log reduction on micro counts to establish the systems efficacy and commercial viability.

The twin oxide application system also requires the stainless steel auger system to be constructed within a purpose built room to enable the residue twin oxide mist to be extracted from the product thus avoiding contamination product contamination issues. A third party being the Uni of South Australia will be conducting the validation studies and residual contamination studies to ensure the system is both effective and doesn't create product contamination issues.

P.PIP.0450 - Trim UV light E. Coli intervention project to maintain market access to US and other markets

This project trials the effectiveness of applying UV lights to trim belts to safeguard exports against E. Coli contamination within the context of a large scale Australian meat processing facility. The project includes the UV system being developed which will be positioned along a product sortation conveyor belt to assess the effectiveness of a UV intervention on trim conveyor system as a management process to safeguard exports against E. Coli contamination. The project will be undertaken at the Murray Bridge facility. The validation study will be undertaken by Uni of South Australia to assess the log reduction on micro counts to establish the systems efficacy and commercial viability.

P.PIP.0460 - Investigating potential benefits of biomass recirculation in a covered anaerobic lagoon

Covered anaerobic lagoons (CALs) were primarily installed to minimize greenhouse gas emissions from waste treatment with biogas generated flared at most sites. Due to the increasing gas prices, biogas captured is now seen as a resource to augment natural gas. This project will explore at Thomas Food International's Murray Bridge facility biomass (sludge) recirculation as one approach to optimise biogas production. This approach has broad industry applicability as most CALs already have sludge removal pipework suitable for retrofit of sludge recycling.

P.PIP.0470 - TFI Beef Trim Management Blending System

The project seeks to increase the value of beef trimmings by the incorporation of inline high precision x-ray CL scanning technology into the grading/mixing process. With a successful outcome, pre-sorted trim product will be automatically; scanned, graded, blended, weighed, and despatched in pre-programmed quantities for packaging. The proposed technology will reduce the amount of labour required for this task, reduce or eradicate CL understatement and CL overstatement and, as a result, reduce rejections and claims and potential loss of market that could arise from continued below par performance, and better allow grinders to confidently fine-tune their recipes.

P.PSH.0639 - Thomas Foods - Innovation Team Professional Development - Lean Manufacturing Leadership Course

Lean Think has clear benefits for organisations well beyond manufacturing. The TFI leadership team undertook a Lean Manufacturing Leadership Course to gain an understanding of how Lean Principles could be applied to the business. Part of the development was a tour of a local business who was 18 months into a 4 year Lean Manufacturing transformation. This provided real insight into the Lean Process.

Efficiency Project Development/Analysis

- Ice making facility for self sufficiency
- High efficiency lighting rollout
- Spray Chilling project analysis and costing
- Redesign Beef Tripe Packing Room
- Boiler upgrade with biogas reuse
- Beef Boning Room Upgrade
- Rendering plant rebuild
- On-site Laundry project analysis and costing
- Switchboard Upgrade Project
- Palletizing automation
- Beef Hook Room relocation
- Beef Slaughter Floor Upgrade
- Bio-Filter for Rendering Department
- Dupps Quad Pass Blood Dryer
- Small stock lairage upgrade
- Twin Oxide Hide Wash
- Chemical Dispensing System
- Small Stock Stunning Improvements
- PVE Slaughter Floor Upgrade

Self-Insurance Project

- Interview & appoint OH&S Staff
- Member of steering committee

Cultural Improvements / Efficiencies

- Recruit Project Engineer for Murray Bridge Plant
- Recruit Maintenance Manager for Lobethal Plant
- Engineering report process – design & develop
- Business Plan development
- Maintenance workshop improvement
- ERP System design and development
- Recruit Lamb Supply Chain Co-Ordinator.
- Feasibility Study to investigate the development of Innovations Teams
- LEAN manufacturing project implementation team
- Wallangarra Final Puller Upgrade

4 Review of Focus Areas

Throughout the last three years TFI has successfully integrated innovation into its overall business strategy to increase operational excellence (specifically processing efficiency and environmental sustainability).

During this period a significant focus has been on increasing operational performance across the group's facilities. To facilitate this, an extensive capital works program has been undertaken to achieve industry best practice. Significant achievement have been made in these identified focus areas since the program commenced. The initial innovation program strategic plan provided the foundation for sustainable practices and plant performance.

The main benefits to Thomas Foods International arising out of CISP in Stage 1 have included:

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5 Discussion

5.1 Review and Refine Ongoing Program Structure

TFI have also extended their innovation programs strategic focus into the area of lamb supply chain management. This resulted in a specific strategy around improving lamb supply and quality. It is envisaged that this initiative will become the foundation for developing strong supply chain relationships to enhance quality, encourage consistency and ensure customers' expectations are met. This will be achieved through the following initiatives;

- Performance and feedback (whole of supply chain signally and messaging)
- individual animal assessment of LMY
- Support for training and resources across their supply chain to build capability in this area
- Producer forums and training

This area of strategic focus will become a priority within the second phase program with an overall tenet of shortening the supply chain in regard to signals and messaging to producers with the objective of reducing supply chain wastage.

6 Conclusions/Recommendations

6.1 CISP Stage 2

It is recommended that TFI continue with the second stage of the CISP program with the following plan:

- Significant broadening of scope and footprint of the program including the piloting of an integrated CISP, Strategic marketing and industry insights program.
- Sheer size and impact of the portfolio and potential to deliver significant outcomes for whole of industry and supply chain given TFI represent 25% of the Australian lamb processing capacity and progressive evolution as a multi commodity food company.
- Need to ensure adequate time and support is allocated to achieve desired outcomes in key high risk areas (e.g. environmental management and automation).
- Develop organisational capability in regard to supply chain engagement, providing MLA the opportunity to influence on farm activity through the collaborative development of producer engagement strategies.

TFI have agreed that Stage 2 of their CISP program will be based on the following:

Furthermore, detailed priorities and projects within each of the expanded TFI key business priority areas of are currently being developed;

- Producer engagement strategy development (development of a differentiated offering both supply and demand side)
- Food Safety E-coli management strategies
- Processing efficiency / processing automation
- Environmental sustainability management (on and off farm)
- People, Culture & Capability
- Strategic marketing & product innovation