final report

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Analysis of information flows and implementation of an e-business solution for Killarney Abattoir

Contents

1 Supply Section Description - Slaughter

1.1   The Problem – Slaughter Perspective

The Slaughter section of the supply chain provides the linkage between the producers and the wholesale, boning and distribution activities.

Information must flow to wholesale/boning functions as well as flow through to retail/ food service. The type of information includes the specific details (kill sheets) for each carcass with MSA data.

Certain carcass or carton information like the MSA grading data, weight, kill date (for aging), body number or carton number (for traceability) as well as normal commercial transaction information must be given forward.

The method for identification through the slaughter process must be robust and capable of audit.

There is also a requirement to provide feedback to the producer on the measured attributes of the carcass, e.g. AUS-MEAT feedback and MSA feedback.

The current work practices at Killarney Abattoir is heavily based on manual paper systems that require specific individuals to have a detailed understanding of the cattle suppliers and carcase/ carton product customers. The specific individuals must also have a very good memory for the various operational/ product details and requirements.

The opportunity of export markets requires a number of operational changes to the information systems as well as the production systems at Killarney Abattoir.

Management of the carcass and carton product within abattoir facilities must have a very high level of accuracy. Operationally this means that all cattle received must be able to be matched to slaughter records and these records matched to grading information.

1.2   The Proposed Solution for Slaughter:

When cattle arrive at the abattoir from a Durong alliance property or feedlot they will have a NLIS Tag.

When the cattle go through the knocking box the individual animal NLIS Tags are read by the hand held NLIS Tag Reader connected to the knocking box. This information will be linked to the abattoir systems. The abattoir will maintain sequence control through the slaughter process to ensure that at time of carcass ticketing the sequence has been maintained.

At the carcass ticketing station a GS1 carcass ticket will be applied (refer to the Meat Industry Document on GS1 Numbering and Bar Coding for the Meat Industry). This GS1 carcass ticket would be used for identification through to boning.

The carcasses would be MSA graded and the MSA data would be available on the MSA website. This data would be imported by the Durong Country Beef Alliance Coordinator.

The Abattoir would send Producer feedback to the supplier of the cattle by use of GS1COM messaging. The messages would be sent by the low cost messaging tools and integrated into the Abattoir software.

The Durong Country Beef Alliance Coordinator would consolidate the Abattoir feedback data, MSA grading data and Feedlot performance data to generate a complete performance profile on each animal.

The carcasses would be scanned at the time of load out by the Abattoir to record the date, time, truck and order that they are loaded out on. (The option of cold weight recording at the load out should be considered to ensure accurate weights are determined for each carcass at load out.)
The Abattoir would send information of carcasses loaded out by GS1COM Messaging to the Boning/ Distribution company and the Durong Country Beef Alliance Coordinator. The messages would be sent by the low cost messaging tools and integrated into the Abattoir software.

All of the proposed system and work practice changes must be suitable for compliance to export requirements.

The abattoir would obtain the following benefits:

- Electronically receive NVDs, Way Bills, individual cattle Identification (through NLIS tags).
- The ability to reconcile cattle supplied against NVDs, way bills, and individual cattle Identification.
- Minimisation of cattle supplied by the procedures or the feedlot that fail grids or MSA specification.
- Reduction in cost of manual entry of livestock information at preparation of kill agendas.
- Accurate feedback for the feedlot and producers.
- Carcass ticket scanning for MSA to improved the MSA Grading process.
- Accurate traceability system for trace forward and track back.
- Reduction in errors created by manual information recording and re-entry of information in to computer systems.

The abattoir would be required to complete the following tasks during the project:

- Receive electronically shipping notice and other information from the Durong Country Beef Alliance Coordinator (eDEC).
- Use the portable race reader to read all cattle unloaded from trucks and record electronically.

- Electronically reconcile electronic NVDs against physical consignments and report errors.
- Use the portable hand held reader to read cattle as they drop out of the knocking box and record in abattoir system electronically.
- Create GS1 bar coded carcass tickets for all carcasses.
- Send producer feedback information electronically on each consignment to the Durong Country Beef Alliance Coordinator.
- Scan on load out and send a message electronically to the Durong Country Beef Alliance Coordinator and Boning/ Distribution facility.
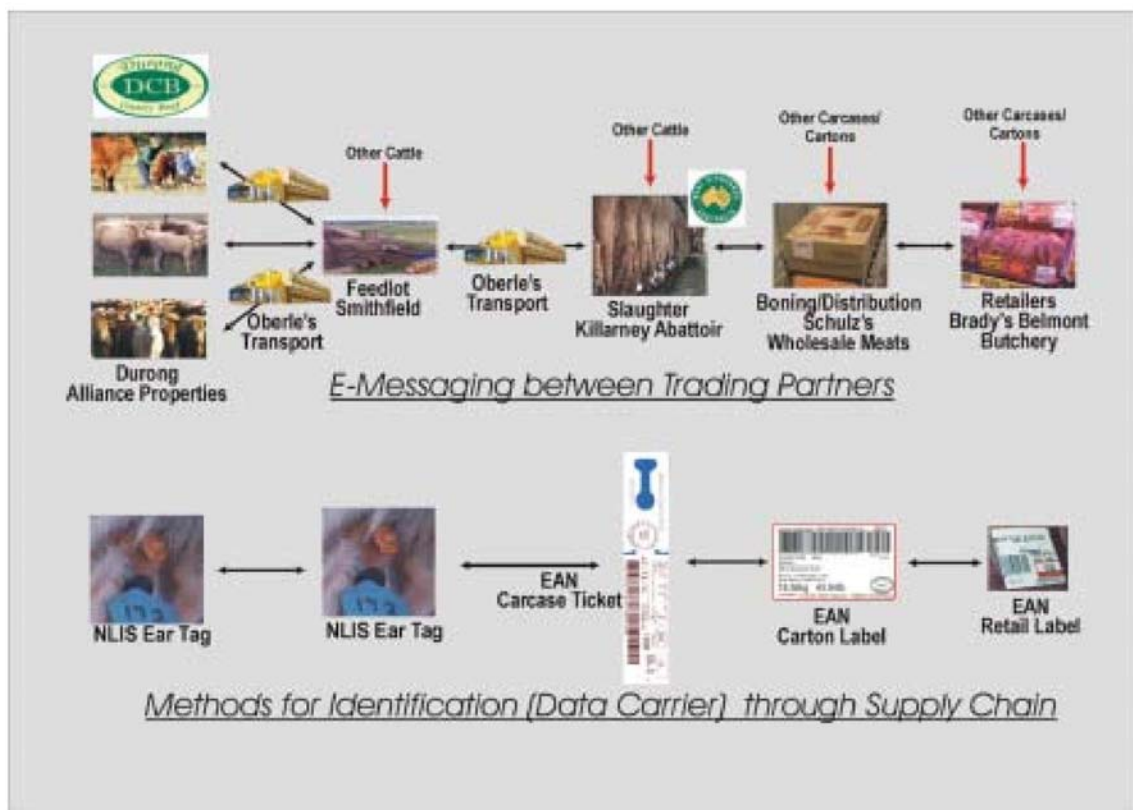
2 Detailed Analysis

The analysis was conducted to determine the following:

- The current work practices for supply chain information flows (forward and back)
- The ideal (as proposed by the participants) supply chain information flows.
- Methods for Product identification.
- The current systems and technology used by the participants.
- The proposed new supply chain information flows.

- The proposed changes to existing work practice for supply chain information.

Much of the information was determined by interviewing personnel and reviewing the site.

The summary of the operational processes and basic requirements is defined in the following table. (The financial recording and reporting is considered to be outside of the scope of the project and currently addressed through software in use on site. However, a suitable system for batch exporting of information to be imported into the existing financial system must be included as part of the project).

Section	What it does	Hardware	Software
Livestock Arrivals	1. Record NVD, MSA declarations (eDEC). 2. Residue Testing and other livestock information. 3. Kill agenda.	1. Office Computer 2. Printer	eDEC for receiving electronic NVD, etc. Livestock Kill Agenda preparation.
Slaughter Floor (Beef and Small Stock)	1. Reading RFID ear tags at knocking and recording the other live information at knocking. 2. Weighing, on floor grading and ticketing of carcasses with GS1 Bar codes. 3. Carcass Inventory management. 4. Producer Feedback (eDEC). 5. Optional Disease information collection.	1. Knocking Box Terminal with RFID reader. 2. Carcass Ticketing system with Scale. 3. Office computer 4. An option for the disease terminal 5. Printer	Slaughter Floor Module interfaced to knocking box terminal, On floor Grading, optional disease terminal and carcass ticketing systems.
Offal Weigh Labelling	1. Weighs and prints GS1 bar coded Carton Labels for carton offal.	1. Weigh Label Station	Carton inventory module.
Hide Management	1. Weigh hides and record against lot 2. Record defect codes 3. Hide report generation	1. Hide Terminal 2. Hide scale	Slaughter Floor Module interfaced to Hide Terminal
Chiller Assessment	1. Perform AUS-Meat chiller assessment or MSA Chiller Assessment.	1. Scanner	Chiller Assessment module.
Carcass Loadout/ Boning room input	1. Scanning/ weighing of carcasses to be loaded out to trucks or to boning room. 2. If to truck then creates a docket and eMTC.	1. Scanner, 2. Scale and 3. Virtual Bar code Scale Interface for Cold Weight out.	Carcass Inventory module with cold weight and boning room entry. eMTC for generating MTC and messaging.
Carton Weigh Labelling	1. Weighs and prints GS1 bar coded Carton Labels.	1. Weigh Label Station	Carton inventory module.
Carton Loadout	1. Scanning of cartons to be loaded out to trucks or to other internal processing. 2. If to trucks then creates a docket and eMTC.	1. Scanner 2. Office computer 3. Printer	Carton inventory module. eMTC for generating

2.1   Current Supply Chain Information Flows and Work Practice – Cattle Arrivals

When cattle arrive they are unloaded into holding yards. The stockman places the cattle in to specific holding yards and informs the office staff when they arrive. The kill agenda is set based on the cattle being held in the lots. The cattle progress through the yards until the race to the knocking box. The cattle are held by lot and the lots matched to the NVDs and MSA declarations before knocking.

2.2   Current Supply Chain Information Flows and Work Practice – Slaughter

Immediately after knocking information about each animal is entered into the slaughter Floor Knocking Terminal. The information includes lot, tail tag number and a body number is automatically generated.

Durong carcasses that have NLIS devices are read using a hand reader and the information manually correlated to slaughter data.

The carcasses then proceed through the slaughter process.

At the Carcass Ticketing terminal the carcasses are weighed, graded and a carcass ticket printed and attached.

The current carcass tickets are not GS1 compliant.

Each lot is segregated by a swing tag which travels through the slaughter process.

The information from the slaughter floor is printed out on the logging printers in the office. The feedback sheets are printed and faxed to the producer and to the wholesaler.

2.3 Current Supply Chain Information Flows and Work Practice – Chiller Assessment

Chiller assessment is conducted manually, as well as MSA grading conducted by MSA graders. The MSA grader prints the necessary MSA sheets and they are sent with the carcasses when the carcasses are loaded out.

2.4 Current Supply Chain Information Flows and Work Practice – Carcass Load out

Carcasses are loaded out with manual weighing and recorded onto multipart dockets. The information is later entered into computer for financial reporting.

2.5 Current Supply Chain Information Flows and Work Practice – Boning and Carton Weigh Labelling

Carcasses enter the boning room and are boned, packed and labelled.

The carton labelling is not GS1 compliant.

2.6   Current Supply Chain Information Flows and Work Practice –Carton Load Out

Carton product is selected and loaded out manually.

The information is recorded manually on to multi-page docket books.
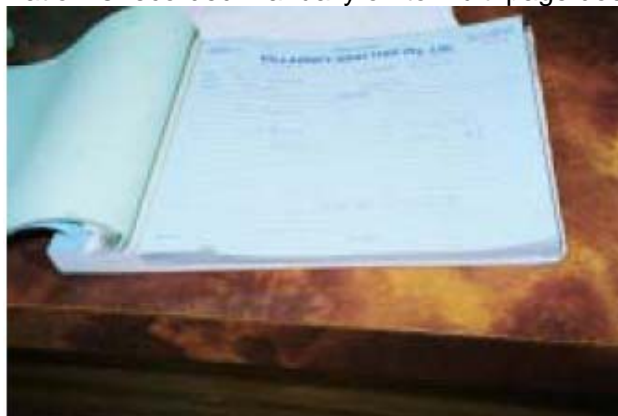
2.7   Proposed Methods for Product Identification

Product through the slaughter link of the supply chain transforms cattle into carcasses and to some extent cartons.

When the cattle arrive they will be identified by the eDEC on which they arrive for the lot as well as the individual NLIS Tags. These tags will be read at the knocking box with a hand held reader connected to the Knocking Box Terminal.

There will be a positive link between the cattle NLIS Tag and the carcass body number. The carcass will be identified with an GS1 bar coded carcass ticket generated at the carcass ticketing terminal.

Each of these products (livestock, carcass, and cartons) must be identified through some method. The proposed methods include the following:

- Livestock – eDEC for lot and NLIS tag for each individual animal.
- Carcasses – identified by GS1.UCC bar coded carcass tickets. The carcass tickets would be applied at the abattoir and used by the wholesaler for inventory management.
- Carton – identified by GS1.UCC bar coded carton labels. The carton labels would be applied by the wholesaler and used for inventory management.

2.8   Proposed New Supply Chain Information Flows
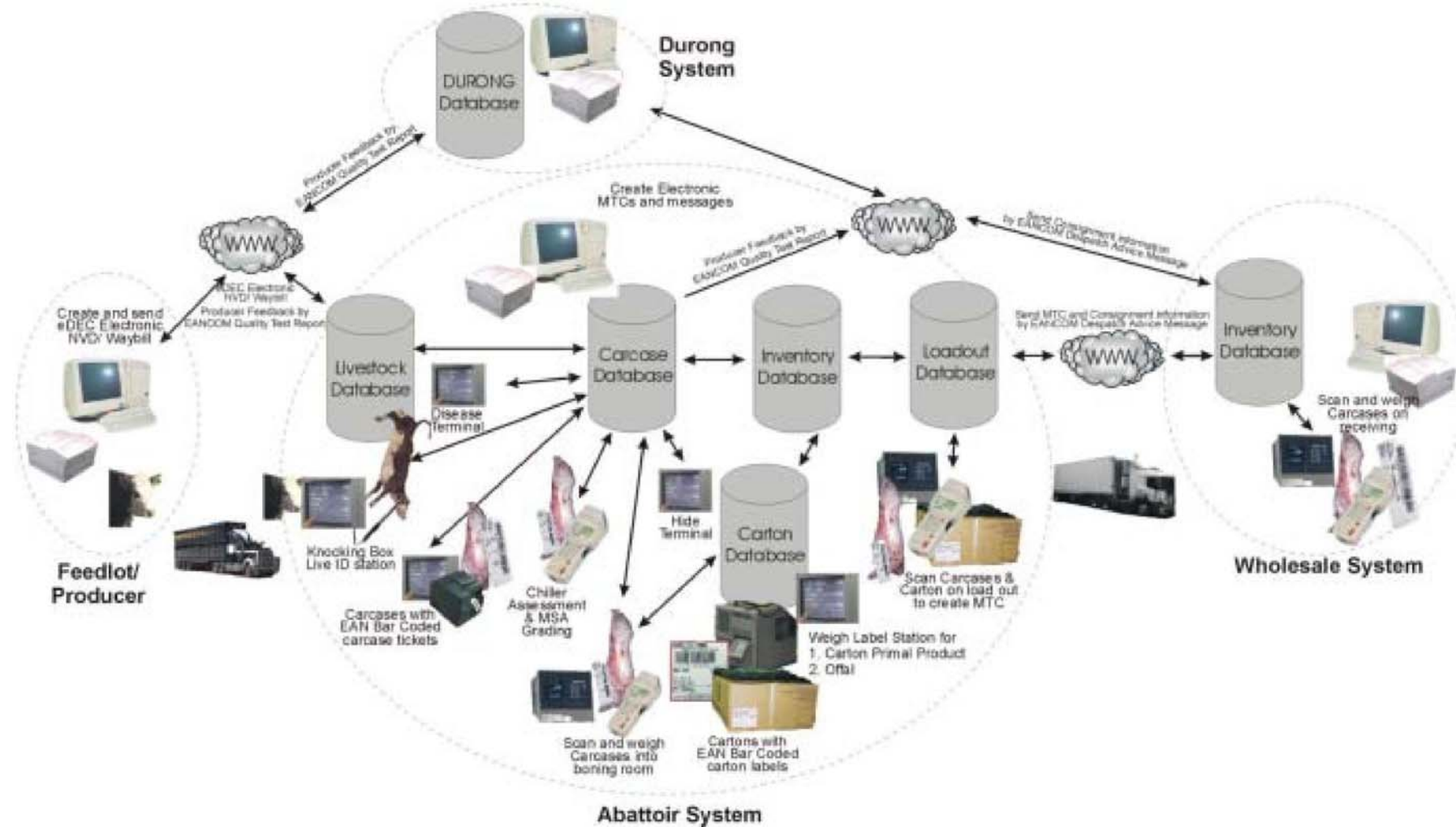
2.9   Proposed Interaction with Other Systems

The abattoir system needs to interact with two other systems. These are the wholesaler system and the Durong system.

The method of interaction between these two systems will be by GS1COM messaging via simple email.

The specific message and information to be sent includes:

- GS1COM Despatch advice message for the eDEC for livestock consignments from the feedlot to the abattoir. The message can include the individual NLIS tag number for each animal in the consignment.
- GS1COM Despatch Advice message for carcass information for consignments from the abattoir to the wholesaler. This includes electronic Meat Transfer Certificates (MTCs) as well as the commercial consignment information (e.g. individual carcass body numbers, weights, kill dates, etc). A copy of this message can be sent to the Durong Country Beef Coordinator for reporting purposes.
- GS1COM Quality Test Report message for feedback information on each carcass is to be sent from the abattoir to the Durong Country Beef Coordinator for reporting purposes. This message contains normal AUS-MEAT feedback as well as MSA feedback.

As the proposed systems rely on scanning bar codes on carcass tickets and carton label all bar codes must be compliant to the GS1.UCC system and specifically to the Guidelines for Numbering and Bar Coding of Non-Retail Meat Products.

2.10 Summary of Proposed Changes to Existing Work Practice and Technology For Supply Chain Information

2.10.1 Work Practice Changes

There are a number of identified changes to the current work practices and existing technology at Killarney Abattoir. These changes have been grouped into the following specific sections.

Each of the functions and equipment defined as part of this project must support export requirements (eg AQIS requirements for the specific export markets.)

Additional labour costs may occur for the additional tasks of electronic messaging, reading RFID tags at knocking, scanning carcasses/ cartons for load out and at the various operational points through the processing to final despatch. However the cost saving in reduction of manual inventory management, documentation creation and product tracking will more than cover the additional labour costs. An example is cost reduction in manual preparation and filing of Meat Transfer certificates.

2.11 Proposed Changes To Work Practice – Cattle Arrivals

Before the cattle arrive eDEC (NVD, MSA Declarations, etc) messages will be received by email. These messages will be used to prepared kill agendas as well as to determine residue testing requirements. When the cattle arrive the number and description of the cattle will be reconciled to the eDEC. Any discrepancies will be addressed.

2.12 Proposed Changes To Work Practice – Slaughter

The slaughter system comprises both the on-floor equipment as well as a carcass inventory system. This tracks the livestock details, livestock individual ID numbers, producers, etc and carcasses that have resulted from the slaughter process. The carcass will have a grade, chiller assessment and other carcass information recorded. The carcass inventory system records the destination of loaded out carcasses.

Beef Chain

2.12.1 Knocking Box Terminal

Immediately after knocking (when the animal falls out of the knocking box) NLIS tag will be read by the operator of the Knocking Box Terminal. The Body Number will be created and the lot number will show both the number of head remaining for the lot and the number that have already been processed for the lot. The Knocking Box Terminal will tell the operator that the lot has finished and a new lot is starting.

The Knocking Box Terminal will support the management tag number and NLIS number (read using a hand held wand reader). Only one electronic tag will need to be read, this will be the NLIS tag. This information is in addition to the normal Knocking Box Terminal information of lot, supplier, tail tag number, etc.

A future option for the Knocking Box Terminal is a live weight scale and interface to be mounted on the rail above the bleed pit. This is to capture the weight of the animal immediately after knocking.

2.12.2 Disease Terminal - Future

A disease terminal is planned to be installed as part of a future stage.

2.12.3 Hide Terminal - Future

A hide terminal with wet hide scale is planned to be installed as part of a future stage.

2.12.4 Offal Weigh Label Station

Offal from the slaughter floor would proceed directly to an GS1 compliant offal weigh label station located adjacent to the slaughter floor. The information from the offal weigh label station would need to link to both the livestock module and the carton inventory module. This is necessary for creating traceability linkages between the live animals and the cartons of offal.

2.12.5 Grading/Ticketing Terminal

At the end of the slaughtering process the grading/ ticketing terminal is used to perform grading and ticketing functions. Following grading, one or more GS1 bar coded carcass tickets are attached to the side for subsequent identification through the chillers to load out or boning.

2.12.6 Producer Feedback - eDEC

After the carcass has been graded (and Chiller Assessment has been completed) an eDEC feedback message is to be created as well as producer feedback being able to be printed and faxed. The eDEC feedback message is to be sent via automated email to the producer and the Durong Coordinator.

Small Stock

The small stock line will have a Grading/ Ticketing Terminal. This terminal will print GS1 carcass tickets for the carcasses and the carcass details will be included in the carcass inventory system.

2.13 Proposed Changes To Work Practice – Chiller Assessment - Future

A future requirement is for AUS-MEAT and MSA Chiller Assessment to be conducted in the chillers. This would be based on scanning the GS1 bar codes carcass tickets and entering the required assessment information. The resulting grade would be recorded and optionally stamped onto the carcasses.

2.14 Proposed Changes To Work Practice – Carcass Load out

Carcass destinations would be determined in the office to fulfill customer orders. As the carcasses are scanned the scanner indicates the orders that they are to fill. This is either to the boning room or to fill specific orders. Carcasses to the boning room would be processed the same as an external order but would be for an internal customer. When the bar codes are scanned the scanner can be configured to accept the cold weight. This weight can be obtained by scanning a Virtual Bar Code interface attached to a track scale of the cold weight.

The carcasses for the boning room would be scanned directly before entry into the boning room to be able to record time and date for traceability.

Load out dockets would be printed showing a summary of the data on the carcass (e.g. grouped by product code, summary of weight, group by kill date, and a count of sides and quarters).

The carcass load out function would create an eMTC messages for sending to the wholesaler/ Durong coordinator. These messages would be sent via automated email.

The carcass load out function is linked to the carton load out function to combine the two sets of information to create one load out docket and one eMTC message per customer/ load.

2.15 Proposed Changes To Work Practice – Boning and Carton Weigh Labelling

The Carcasses that enter the boning room would have been recorded by scanning through the Carcass Load Out function. As cartons of product are packed an GS1 Bar Coded carton label would be attached. The Carton Inventory System updated as each carton is created. The Carton Inventory system tracks all cartons until carton load out.

The date and time of each carton being packed is recorded in the Carton Inventory System and can be queries against the date and time of each carcass that was scanned before entry into the boning room. This process is part of the traceability system that links carcasses to carton. Traceability report can be generated that show the possible cartons that came from a specific carcass as well as the possible carcasses that went into a specific carton.

2.16 Proposed Changes To Work Practice – Carton Load Out

Carton destinations would be determined in the office to fulfil customer orders. As the cartons are scanned the scanner indicates the orders that they are to fill. This is either to fill specific orders or could be internal for use in value adding activities. Cartons to the value adding activities would be processed the same as an external order but would be for an internal customer.

Load out dockets would be printed showing a summary of the data on the cartons (eg grouped by product code, summary of weight, grouped by production date, and a count of cartons).

The carton load out function would create eMTC messages for sending to the wholesaler/ Durong coordinator. These messages would be sent via automated email.

The carton load out function is linked to the carcass load out function to combine the two sets of information to create one load out docket and one eMTC message per customer/ load.

2.17 Technology Requirements and Role Out Plan

2.17.1 Technology Requirements

In technology terms the specific systems/ equipment required for the project have been identified as follows:

Hardware Summary (indicative only):
Knocking Box Terminal (including NLIS Tag hand held reader).
Track scale for live weight (Stage 2).
Disease Terminal (Stage 2).
Hide Terminal (Stage 2).
Wet Hide scale interfaced to the Hide Terminal (Stage 2).
Grading/ Ticketing Terminal x 2 (Beef and small stock).
RF Bar Code Scanner x 2 (used for Chiller Assessment and carcass/ carton load out).
Virtual Bar Code interface for connection for track scale for cold weigh out.
RF Access Point.
Offal Carton Weigh Label system.
Carton Weigh Label system.
Office Computer System and docket/ report printer for load out office.
Office Computer System and report printer for livestock (Feedback) and kill agenda scheduling.
Office Computer System and report printer for order entry and inventory management.
Database Server.
Internet connection for email.

Software/ Module Summary (indicative only):

Livestock Receiving/ Slaughter Floor Module.
- eDEC message receiving for NVD and MSA declarations.
- Kill agenda with Residue testing schedule and MSA eligibility.
- Individual animal identification.
- Livestock weigh recording.
- Carcass grading.
- Hide weight, damage status and reporting.
- Offal carton management (traceability)
- Grid management.
- Payments.
- Condemns/ disease details and reporting.
- Producer Feedback (including chiller assessment, MSA grading data and diseases) using fax and eDEC Producer Feedback.

Chiller Assessment Module.
- AUS-Meat and MSA chiller assessment recording, processing and grade assignment.
- Carcass Inventory Module.
- Recording of livestock and slaughter details against individual carcasses. - Carcass load out with cold weight, orders and destinations.
- Traceability reporting.
- Load out reports, dockets and invoices.
- Create eMTC messages for sending by automated email.

Carton Inventory Module.
- Boning room entry recording with cold weight, carcass body number, kill dates, slaughter plants, date and time of entry. This is used for traceability.
- Product type check. e.g. if carcass is not a certain MSA grade than the program has to stop entry to boning room.
- Recording of carton product produced by product type, orders, date, time and serial number. This is used for traceability.
- Carton load out based on orders and destination. Carton location reference is also necessary.
- Offal Carton product management.
- Traceability report linked to Carcass Inventory Module. Possible cartons for a carcass and possible carcasses from a carton. Companion carton reports.
- Load out reports, dockets and invoices.
- Create eMTC messages for sending by automated email.

2.17.2 Role Out Plan

The timetable for the implementation of the various technology and work practice changes is dependent on funding and supplier availability. Ideally the updated solutions will be implemented and operational by July 2004.

The various vendor proposals will need to define the role out plan including time frames.

2.18 System Implementation Report

2.18.1 Implementation Activities

Over the period of April 2004 to June 2006 various of the system where implemented in line with the defined technology requirements.

The implementation process occurred in the following order:

- Carton weigh label stations for carton product in the boning room. December 2005
- Small stock line – February 2006
- Cattle line – June 2006
- Load out – June 2006

The implementation time frame was based on the ability of the installation and commissioning match to work loads and training requirements.

2.18.2 2.Carton Weight Label Stations

The carton weight label stations and inventory control systems are based on the GS1 standards for numbering and bar coding.

Product codes are controlled through the carton system. The GS1 bar coding is linked to the product types and visual descriptions as well as the AUS-MEAT language. The systems operate on a PC platform so training can be provided in a training room environment to ensure competence before an operator commences on floor.

Carton weigh labels stations are operating successfully on floor.

The printed carton labels comply with the GS1 Standards and the guidelines for numbering and bar coding meat products.

Carton product is palleted ready for shipment. The cartons and pallets are controlled through the inventory system that provide the traceability linkages from boning room to distribution.

2.18.3 Small Stock line and Cattle Line

The slaughter systems are functionally equivalent but are located in positions to match the requirements of either the small stock line or the cattle line.

The slaughter floor systems, like the carton weight label stations operate on a PC platform allowing training to occur in the training environment. The slaughter floor systems and inventory control systems are based on the GS1 standards for numbering and bar coding.

The carcass tickets include a GS1 compliant bar code that provides the traceability linkages through to the boning room.

2.18.4 Inventory and Load Out System

The inventory system provides the bases of the traceability back bone of the Killarney system. From arrival and scanning of NLIS devices through to load out of cartons and carcass traceability information is maintained.
Traceability analysis can be readily conducted that show the source livestock and the loaded out destinations for either carton or carcass product. Trace back analysis can be conducted that show the possible source livestock for a specification carton record.

The inventory system provides the functions for the messaging abilities for eMTC and eDEC. The messages can be translated directly in and out of the inventory system.

3 Amendment Register

Version	Amendments	Issue date
1	Initial Issue	1st April 2004
2	Update for Implementation status	3rd August 2006