# ELECTRONIC DATA COLLECTION FOR MEAT INSPECTION

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| **PROJECT CODE:** | **2017-1066** |
| **PREPARED BY:** | **National Meat Industry Training Advisory Council (MINTRAC)** |
| **DATE SUBMITTED:** | **9 June 2017** |
| **DATE PUBLISHED:** | **4 July 2017** |
| **PUBLISHED BY:** | **Australian Meat Processor Corporation Limited** |

The Australian Meat Processor Corporation acknowledges the matching funds provided by the Australian Government to support the research and development detailed in this publication.

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## 1.0 EXECUTIVE SUMMARY

There is a growing interest on the part of the red meat industry to capture and report on the health of livestock slaughtered in processing plants throughout Australia. Such health data can be of significant benefit to the processor and the producer.

The importance of providing accurate, timely feedback to producers has been a high priority of the Sheepmeat Council and WoolProducers Australia in recent years. Producers can use the livestock health data they receive to review and modify their husbandry practices to achieve greater productivity and profitability.

For processors, there is a growing understanding of the value of having timely and effective lines of communication with producers. A number of processors have trialed and then implemented a variety of supply chain communication models. Such communications have the potential to improve the quality of incoming stock and an overall improvement in yield for the processor.

However, when it comes to capturing this data on high throughput sheep slaughter floors the sheer speed of the chain presents significant problems. The meat inspectors struggle currently to record health data accurately. Whether the data is recorded manually on paper forms or on electronic touch screens the best meat inspectors can do is to make estimates of the percentage of a lot affected by a particular disease or condition. There are also approximately twenty sheep diseases or conditions of interest to producers and processors. The situation is compounded by the length of the day worked by the inspectors and the role fatigue plays in accuracy.

In order to enable the accurate capture of livestock health data at the point of post-mortem inspection MINTRAC has been funded to develop and trial a simple database for livestock processing plants that:

// enables easy recording of animal health data on slaughter floors by utilising voice recognition software

// allows the capture of health data for lots recorded against NVDs, PICs and owners details

// includes an automated system of alerts when health conditions for a lot exceed a pre-set limit.

// has the capability to generate automatic reports to producers, supply chain managers, livestock buyers and QA managers.

This project has focused on utilising existing technologies and software that was readily adaptable to the meat inspection process that can improve the accuracy of recording diseases and conditions.

This project has in addition identified the steps required to implement the system in pilot plants and these include:

// training staff

// providing support for software and hardware

// the assessment of the effectiveness of the system.

## 2.0 INTRODUCTION

Systems for providing accurate, timely feedback to producers and processors has been a focus for significant red meat industry investment in recent years. Such projects include the National Sheep Health Monitoring Program and Livestock Data Link. In addition, many companies are investing in managing their supply chains and providing feedback to producers. Such feedback systems have the potential to improve the quality of incoming stock and an overall improvement in yield.

The collection of animal health data at the point of post mortem inspection is central to these feedback systems. However, currently the largest obstacle to the accurate collection of health data in sheep processing plants is the chain speed. Because data for individual animals can't be entered, the inspector is required to estimate the proportion of a lot affected by any one condition and record this quickly between lots (electronically or in writing). Inspectors are monitoring up to twenty diseases and conditions and this adds to their difficulties when remembering the incidence of diseases and conditions in any one lot. This leads to a degree of subjectivity in making assessments, as well as potential for errors in transcription.

This project has focused on utilizing available technologies and software that can be adapted to the meat inspection recording process with the aim of improving the speed and accuracy in recording diseases and conditions. The project also has developed a link into a database that can improve reporting to processors, national data bases and producers.

This project has also identified the next steps in piloting this recording system/data base in other plants in terms of training staff, providing support for software/hardware as well as the assessment of the effectiveness of the system.

## 3.0 PROJECT OBJECTIVES

The project objectives as specified in the research agreement are:

// **improve the speed and accuracy of carcase inspections**

// **identify and trial available technologies**

// **standardize recording systems using a standard database**

// **improve the speed and usability of feedback data provided to producers.**

## 4.0 METHODOLOGY

MINTRAC adopted the following Stages when developing the system.
Stage 1

// Consultation with sheep processors and meat inspectors to identify needs, concerns and priorities to be incorporated into the database.
// Development of a database framework.
// Purchase of voice recognition technology/software for trial
// Development of a draft reporting format.

### Stage 2

// The software and reporting system will be trialed with two NSW sheep processors.
// Training sessions for affected staff will be conducted.
// Refinements of the system will be identified and made as the trials progress.

### Stage 3

// Full evaluation of the trial.
// Recommendations for further development.
// Recommendations for production, implementation and roll-out of the software system.
// On-going support system identified and implemented.
// Process for identifying and implementing future system upgrades identified.
// On-site training program for new users developed.

### Stage 4 (post-project)

// Roll out to sheep processors Australia-wide using the methodology described and agreed with AMPC in Stage 3.
// Promotion and awareness-raising of the model through MI&QA and training network meetings and relevant industry conferences
// Assessment of applicability for beef processors.

## 5.0 PROJECT OUTCOMES

The outputs of this project have been:

### 5.1 A system for gathering health data from the slaughter floor

This system has been developed for recording diseases and conditions using current technologies. It uses noise cancelling microphones and voice recognition software to process the information gathered by an inspector on diseases and conditions for each lot being processed. The noise cancelling microphone and ear phones enable the meat inspector to orally record the conditions and hear the confirmation that the data is being entered correctly.

### 5.2 A link has been created to a standardized database

The text captured from the slaughter floor for each lot is exported to a database that records fifteen conditions for sheep and lambs. The database records lot numbers, associated PICs and owner details. The database also can be used to alarm on lots that exceed processor tolerances for diseases and conditions as well as calculate daily and long-term averages for each disease and condition.

### 5.3 Format and structure for producer and supplier feedback reports

The format and structure of reports for the producer will detail the conditions and diseases detected in lots processed on a specific day. Processor reports allow processor staff to identify the long-term averages for each disease and condition as well as daily averages. The database also allows the company to identify lots and PICs that exceed processor tolerances for diseases and conditions. The report format also allows data to be uploaded to national databases such as EDIS.

## 5.4 Training program for new users

A guide to implementing the data collection system has been developed including training materials for inspectors and the specifications for IT software and hardware components.

# 6.0 DISCUSSION

The accurate collection of livestock health data is now pivotal to the initiatives that MLA and processors are undertaking to establish meaningful supply chain communication. In sheep processing this collection of post mortem information is complicated by chain speed. One possible solution that this project sought to investigate is inspectors orally recording the diseases and conditions they observe and then using the voice recognition software to turn this oral recording into text. This text can then be imported into a data base and reports and records generated.

The most challenging aspect of this project was capturing the vocal recording with enough clarity that voice recognition software could reliably decipher the diseases and conditions. There were three principal hurdles:

// the noise of machinery and people on the floor

// the radio interference that impacts on blue tooth performance

// the ability of the voice recognition software to distinguish individual voices.

Noise cancelling microphones worked very well in simulated high noise environments and the initial software, utilizing a blue tooth connection, was able to recognize the vocal recordings of fifteen conditions with a 90 % accuracy. However, reliability decreased dramatically on the slaughter floor. The issues were potentially due to:

// the nature of the slaughter floor noise which overwhelmed the voice recognition software which slowed dramatically

// the impact of the electrical motors that created interference for the blue tooth function.

These problems were addressed by:

// increasing the computing power with an upgraded Surface Pro

// upgrading the voice recognition software

// moving to cable connection between the headset and the Surface Pro

// using a very light back pack for the Surface Pro.

This configuration has created a stable system with 100% recording accuracy for 15 conditions from the slaughter floor. The voice recognition software requires approximately 1 second to translate voice to text and this allows for the continuous recording of conditions. The data transfer to the data base is faultless and the reports accurately and clearly describe the health data status for each lot.

The only outstanding issue is overcoming the interference to the blue tooth initially deployed and this could be resolved in the future during long term pilots.

## 7.0 CONCLUSIONS AND RECOMMENDATIONS

Voice recognition will work for the recording of sheep health data on the slaughter floor. The voice recognition software Dragon copes well with the noise levels on the slaughter floor and the cable connection to the Surface Pro has overcome the interference of electrical motors. The back-pack system does not limit the inspector's movements and at a total weight of 1.5Kg should not present an issue.

The data base allows the production of clear reports for processors and producers. What is required now is the trialing of the system on three high-speed sheep chains for 3 months to ensure the reliability of the hardware and that there are no bugs in the software.