Global traceability in the meat industry –
the future now

by Gary Hartley, GS1 New Zealand General Manager, Sector Development

Meat industry traceability from farm to retail store using global identification standards and off-the-shelf RFID technology – it can certainly work in New Zealand today! GS1 has proved the concept in a real-life supply chain, using the EPCglobal Network as a traceability tool.

We ear-tagged 10 cattle on a Canterbury farm and tracked them through meat processing, and then as cartons of meat received into a suburban Christchurch retail store. Unique item identification, captured from the RFID tags at each of nine read "event" locations was transmitted to the EPCglobal Network (see right). This web-based computer network – it works much like the Internet itself – has an information receiving, storage, query and response component called the EPC IS (Electronic Product Code Information Service). Because each read event captures the unique identifier of the item, its location and the read time, then the EPCglobal Network can make real-time traceability a reality.

GS1 collaborated with meat processing and marketing company ANZCO Foods for this Proof of Concept (PoC) exercise – probably the first of its kind anywhere in the world.

Traceability is increasingly important to the New Zealand meat industry as European, American and Asian export markets demand more of it, and as farmers and others prepare for the implementation of NAIT (National Animal Identification and Traceability) from late 2011 onwards. Our PoC, in May, built on previous trials in the use of ultra high frequency (UHF) RFID tags on cattle, deer and sheep in typical on-farm situations: These were conducted by the New Zealand RFID Pathfinder Group and Rezare Systems during 2008 and 2009/10 respectively (with GS1 input).

We went much further than any previous trials have done using UHF tagging of animals, carcasses and cartons. The scope of this PoC was widened to include UHF RFID performance in a meat processing plant and a retail store. Previous studies have focused primarily on RFID research in a "farm-only" environment. Careful attention to the use of EPC-only standards was paramount in the PoC design. This meant that all item and location identifiers were EPC standards compliant as were the RFID tags, readers, network and process standards. GS1 New Zealand worked very closely in the PoC design with GS1 Hong Kong (and partners) and during the PoC itself, it was GS1 Hong Kong's EPC IS implementation that was used to receive and record the read event information for later processing.

The whole process – tag reading, data loading onto the EPC IS and assembly of meaningful traceability information – worked

EPC *in simple terms*

What the GTIN (bar code number) is to bar coding, the EPC (Electronic Product Code) is to RFID. When an RFID reader scans (or reads) a tag on a carton of lamb shanks, for instance, the tag sends the carton's EPC number to an inventory management system, recording exactly which carton, where it was "seen" and at what time. The EPC refers, in fact, to a suite of standards that make up a network – the EPCglobal Network.

The bar code on an item in the supermarket contains only the identity of the product and its manufacturer. In contrast, the EPC enables the inclusion of serial numbers which identify the item right down to the "instance" level, i.e. a case of lamb shanks can be identified separate from all other cases of the same product. EPC numbers are not only used to identify items (e.g. GTINs, SSCCs*), they can be used to identify locations as well (GLNs*). In a meat processing plant, an EPC number can be used to uniquely identify specific locations on the site (e.g. a boning room, an export dock door). The numbers are serialised to each instance (e.g. SGTIN, SGLN).

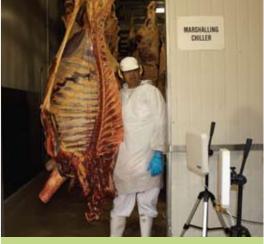For tags and readers to be EPC compliant, the equipment needs to comply with a number of EPC related protocols and standards. A key hardware standard requirement is for all EPC tags and readers, irrespective of who manufactures them, to be able to "talk" with each other – in technical speak, to be inter-operable.

The EPCglobal Network is an Internet-based global system that combines EPC with RFID and other communications technology so that individual items can be tracked and traced for all or part of the items' life cycle. The system encompasses the EPC identification numbering schemes and a special network component named the EPC IS, or Electronic Product Code Information Service. The EPC IS is the data base component of the EPCglobal Network which stores individual item data and event reads. It enables network users to exchange EPC-related data and thereby, to manage the movement, storage and presentation of the dynamic information required for traceability.

EPC IS can be used in any industry, anywhere in the world. It can be used to link entities, objects, places and occurrences of all kinds in a dynamic manner that is sometimes referred to as an "internet of things".

GTIN is global trade item number, SSCC is serialised shipping container code, GLN is global location number.

Read event 1:
Animal tagged on the farm

Item:
Cow

Data:
EPC identifier for each cow (SGTIN for cow)
EPC identifier for the farm (SGLN for farm)

Business step:
Commissioning

Read event 2:
Animal leaves farm

Item:
Cow

Data:
SGTIN for cow
EPC identifier for truck loading ramp (SGLN for ramp)

Business step:
Loading

Read event 3:
Animal arrives at processing plant

Item:
Cow

Data:
SGTIN for cow
EPC identifier for holding yards at processing plant (SGLN for yards)

Business step:
Receiving

Read event 4:
Animal arrives at stun box

Item:
Cow

Data:
SGTIN for cow
EPC identifier for plant's stun box (SGLN for stun box)

Business step:
Transforming

Read event 5:
Carcass stored in chiller room

Item:
Carcass

Data:
EPC identifier for carcass (SSCC for carcass)
EPC identifier for plant's chiller room (SGLN for chiller room)

Business step:
Commissioning

Read event 6:
Carcass arrives in boning room

Item:
Carcass

Data:
SSCC for carcass
EPC identifier for plant's boning room (SGLN for boning room)

Business step:
Transforming

smoothly. All tag data was successfully captured and recorded at each read point, for transmission in XML format to the server. Over the course of several days, we built a comprehensive picture of what happened to each animal, carcass and carton of meat, where, when and why.

The information could be accessed by any appropriate supply chain participant. Ultimately, the PoC confirmed that the EPCglobal Network, especially when supported by EPC Gen 2 UHF tags on animals and other objects, can be used effectively as a traceability tool for the movement of cattle from farms, through processing plants and on to retailers in the form of cartoned meat.

ANZCO Foods IT Manager Mark Rance agrees that the PoC has shown that the EPCglobal Network is more than capable of meeting the future traceability and proof-of-origin demands of customers and consumers in international markets.

Beyond the meat industry, the Proof of Concept provides valuable insight for any enterprise wanting to explore its own possible transition into EPC/RFID for traceability purposes in any type of business. Properly used, the technology can enable companies and other organisations to manage their supply chains more effectively, to respond more quickly to market needs, and to meet safety and regulatory requirements in local and international markets.

See the full report, "The Efficacy of Using the EPCglobal Network for Livestock Traceability: A Proof of Concept" by Gary Hartley and Erik Sundermann, June 2010, available on **www.gs1nz.org/resources**

Need help with your **RFID business** case?

The New Zealand RFID Pathfinder Group has launched a Business Case Support Programme (BCSP) to help enterprises develop their own business cases for adoption of EPC/RFID. The Group, which has financial support from GS1, recognises that some enterprises do not have sufficient technical knowledge and planning skills to start their own EPC/RFID projects, even where large benefits could be secured. The BCSP provides advice and funding for business case preparation. The Group intends to provide such support for up to five suitable enterprises over the next 12 months.

For details, see www.RFID-pathfinder.org.nz

"Gerry Weber International sews in RFID benefits"

Live skype video presentation from Germany by CIO Christian von Grone

18 November 5.30 – 7pm
Open to all
Owen G Glenn Building, University of Auckland
School of Business
12 Grafton Road, Auckland

Hosted by the New Zealand RFID Pathfinder Group
To attend, please RSVP to info@rfid-pathfinder.org.nz.

Read event 7:
Meat cuts packed in cartons

Item:
Carton of meat

Data:
EPC identifier for carton of meat (SGTIN for carton)
EOC identifier for plant's packing line
(SGLN for packing line)

Business step:
Commissioning

Read event 8:
Cartons loaded into containers

Item:
Carton of meat

Data:
SGTIN for carton
EPC identifier for plant's loading-out dock door
(SGLN for plant's door)

Business step:
Shipping

Read event 9:
Cartons received at retail outlet

Item:
Carton of meat

Data:
SGTIN for carton
EPC identifier for retailer's receiving dock door
(SGLN for retailer's door)

Business step:
Receiving