Dramatic episodes, such as the BSE and the Foot and Mouth crises, show how important it is to be in possession of all the information relating to the history of a consumer product – where it came from, where and how it was processed, what checks and tests were made, and so on.

The lack of data, and the lack of access to data, in the cases above, exacerbated an already serious situation.

In other branches, too, such as car and electronics manufacturing, 'Track and Trace' of components is considered a critical and essential factor in the success of the operation. Quality assurance and logistics management are often only introduced or tightened after lack of control has caused incidents that were not only costly, but which also resulted in a significant loss of prestige for the company and damage to the product brand. Despite this, such incidents continue to occur, those in the automotive and food industries receiving

Track and Trace: Basis of the supply

Knut Andersen, Jan-Erik Gutman

THE UNEXPURGATED HISTORY OF YOUR JUICY RIBEYE - FROM CRADLE TO PLATE

By Jill Vardy.

OTTAWA – Retailers will soon be able to give their customers more than recipe tips for their steaks – they will be able to tell them what the cow ate before it became steak.

Viewtrak.com is an Internet-based system that allows cattle producers to track animals, in the company's words, "from the barnyard gate to the consumer's plate." Executives are pitching the new cattle tracking service as a weapon for cattle producers battling the consumer fear of mad cow disease and other contaminants in beef.

Viewtrak is the brainchild of Edmonton veterinarian Jake Barlet. It was created with the help of Online Business Systems, a Winnipeg software company that designed the technology. Viewtrak can track the origin of an animal, its parents, its vaccinations, medications, feeding, breeding, weight when sold and where and when it was butchered. The meat can be tracked from the place of sale to consumers – making

exposed to risks such as bovine spongiform encephalopathy, also known as mad cow disease. "We provide the mechanism to track the feed animal up until the point of processing, and trace it to processed and portioned into individual cuts of meat. The technology exists to trace those cuts back to a particular animal," Dr. Barlet said.

"So, conceptually, consumers would be able to take a bar code scan off a retail piece of beef and go to the Viewtrak site and find out where the animal was raised, if it was raised outdoors in an environmentally renewable way, what medication it received and what kind of feed it ate." The system can't tell all that information yet because it's just starting to track cattle born this year – animals that won't be slaughtered for at least 18 months.

John McKinnon, a professor and Beef chair at the University of Saskatchewan, said this type of "fork to slaughter" tracking system isn't widely used anywhere in the world. "But as beef producers want to become more specialized and par-

will help Canadian cattle producers sell into markets spooked by mad cow disease.

For example, Japan last week announced it is going to require all beef products be certified BSE-free. "We're going to need a robust and transparent system to meet those demands," Dr. Barlet said. Canada started a national cattle identification program this year. Beginning Jan. 1, each calf needs an eartag attached with an embedded electronic chip with a unique animal number when it is born.

Viewtrak builds on that tracking system, with an Internet database where the animals' owners can record all relevant information through the production cycle. Dr. Barlet said customers are signing up for the service as they near the spring calving season. The Canadian Cattle Identification Agency, the organization managing the identification system, has told Viewtrak that within three years, it's likely 75-80% of the country's 105,000 cattle producers will be using a system such as Viewtrak's for cattle identification.

"We haven't been that aggressive in planning but that's the feedback [we've given us," Dr. Barlet said.

UK: ON TRACK FOR TRACEABILITY.

Linda Pettit looks at how far the establishment of a computer database recording cattle movement will go towards re-establishing consumer and retail confidence in the beef sector

A calf called Udder christened the system hailed as set to "revolutionise" Britain's beef industry. The Limousin bull calf was the first animal to be registered by the new British Cattle Movement Service (BCMS) established in September.

"This is a milestone for the British cattle industry," commented agriculture minister Nick Brown earlier this year. "This new system will make it easier to trace cattle if there is a disease outbreak, and give greater assurance to those buying cattle about an animal's history. It is also a milestone for consumers, and will improve confidence in the food chain."

Officially opening the BCMS scheme last week at its Workington base, Brown was upbeat about the contribution it will make to consumer confidence. "Our commitment to setting up the new Cattle Tracing System has to be the ultimate proof that this Government is serious about restoring confidence in our beef industry," he said. "I urge retailers, food manufacturers and others in the food industry to come and see the BCMS operation for themselves. I also urge others in Europe to

tured both the farming industry and retail sales – the HSC estimates that it cost retailers £2bn-worth of beef and beef-product sales. By the end of 1999, traceability in cattle will also be required by EU law.

The new scheme records the movement of each head of cattle in the UK, including sale from farm to farm, sale at market, slaughter at abattoir, and arrival at the process plant. While the system cannot provide full traceability from retail to farm, it means the beef industry is as traceable as is logistically sensible. It enables retailers to trace packaged beef back to the processor and batch number at slaughter, which can then narrow down the source of the meat to one of perhaps six farms.

The Meat & Livestock Commission's industry development adviser Archie Sains, who sat on the advisory committee that helped establish the movement scheme, questions whether there is any real need to be able to go back any further. "If Mr Tesco has a package with a problem, it has a bar-code and a date, and they would know where it was packed, and the timing of the packaging, and could narrow it down to one of 40 animals that came from one of six farms," he says.

When the BSE scare reached its

food chain. The use of mammalian meat and bonemeal in feed for all farm animals was also banned.

According to MAFF, this year the UK can expect between 2,600 and 2,891 cases of BSE. This compares with 15,673 cases at the peak of the outbreak, and MAFF hopes that the disease will be totally eradicated from the national herd by the year 2001.

But gauging the long-term effect of BSE on consumer confidence is more difficult. Alan Johnson, technical manager of Pluntree Farms, which makes burgers and sausages mostly for the catering sector, believes his customers have swung firmly back to British beef. "The British don't like to be told what to eat," he says. "Several schools are now insisting that the beef we supply is British – and we are most protective of our children, so any concern would show up in schools."

In the two months following the BSE crisis, his business – typical of the sector as a whole – dropped 25%, but in the two years since, he says it has now picked up to levels higher than those predating BSE. But one of the key concerns, from both consumer groups and retailers, was the lack of traceability in the beef chain. If a case of BSE occurred in a producer's herd of cattle, it was virtually

particularly close media scrutiny and the attendant unwelcome (for the company involved) publicity.

But it is not only big-ticket crises that deserve attention. Many operations are slowly bled by frequent problems (and costs) brought on by partial and poor control in production processes that account for loss in performance, yield and production output.

To secure quality and minimize risks, there are several courses of action that a company can take, covering well known areas such as quality assurance in the supply chain as well as in production and logistics.

Industry has learned that instant access to a full suite of Track & Trace information is essential in order to make decisions right through the supply chain – as a product moves from its origin to the consumer. ABB's Industrial^{IT} for Track and Trace provides a solution for this.

and product chain

Unisys Developing Database Solution To Help Combat BSE

UNISYS Corporation has announced that it has designed a prototype National Cattle Identification system for mainland Britain.

The Unisys system, which is being developed in close consultation with the dairy and beef industry, is designed to track the location of all the estimated 10 million beef animals in England, Wales and Scotland, from birth to slaughter. A Unisys system already tracks all cattle in Northern Ireland, where the location of all animals infected with bovine spongiform encephalopathy (BSE), together with their cohorts, is known. The UK cattle industry was afflicted recently by a widely publicized outbreak of BSE, commonly called "Mad Cow Disease."

While Ulster farmers might expect to be resuming the export of their beef worldwide soon thanks to the traceability the Unisys system provides, the farmers in Scotland, Wales and England face a beef export ban until 1999, in spite of the widely publicized selective culling of herds.

Nationwide Network

With the Unisys system, every farm, market, government veterinary surgeon and slaughterhouse would be connected to a nationwide network, with farmers, vets, market and slaughterhouse managers telephoning, posting, FAXing or using the Internet to provide details of all animals that pass through their hands.

Although the problem of BSE has started to decline, the British government, together with the European Union, has said that such a system must be in place by January 1, 1998, and that the ban on the export of UK beef products will not be lifted until it is in place. The Unisys system will provide updates because vets and slaughterhouses. In the event of a contagious disease outbreak, officials would be able to trace immediately where infected animals had come from as well as all the other animals they had been in contact with.

The prototype system was created under the auspices of the Government Systems practice of Unisys Information Services Group, using rapid application development techniques from USoft, Unisys software company. The solution has been designed in partnership with Coopers and Lybrand Management Consultants, which has already carried out a number of studies on behalf of the UK Ministry of Agriculture, Fisheries and Food (MAFF) into the effects of the export ban on the UK beef industry, and ALC Consultants, an agricultural consultancy that includes farming practitioners among its members.

TESCO TAKES TRACEABILITY TRACK

A producer group scheme is being launched by Tesco to provide better traceability in its beef supply chain. The project appears similar to the partnership and contract techniques used by Sainsbury, M&S and some other multiples for establishing links with farmers.

Tesco was a pioneer in central preparation of shop-ready meat packs, and has close links with West Country supplier St Merryn and some of the Irish packing plants – but it has been seen as slower than other major retailers in developing commercial relations with livestock breeders.

The new initiative involves "clubs" connecting the company with abattoir operators and the farmers supplying stock to them. It is already under way in Cornwall, where 400 producers have signed up. Fresh meat director Andy Batty says the BSE crisis was a major factor prompting Tesco to launch the project. "We have to make significant strides in demonstrating to our customers that we can accurately trace our meat back

animals were bred, and that the meat was produced to the most exacting standards."

The producer club network is being extended from Cornwall to other Tesco supply centres at Perth and Huntingdon. Group members will earn quality and loyalty incentives beyond carcase quality bonuses already available. Although the scheme launch will inevitably be regarded as an unusual example of the company lagging behind Sainsbury in marketing initiatives, Tesco's record of monitoring the beef market closely is not doubted.

The company was the first major multiple to acknowledge publicly that demand for beef was a cause for concern, well before the latest BSE crisis started. "In the longer term, Tesco hopes to develop the producer group concept to give farmers cost savings on transport and feed," Batty added. Each supply centre will also hold carcase competitions to pass back information to

Quality is usually affected by a combination of raw material variability and the reliability of the processes applied throughout the production and supply chain. Thus, the ultimate solution would be to capture *all* relevant information and provide *real-time* management support. Performed on-line and integrated to cover the whole product chain, this would give the company appropriate control of its entire value chain. In order to handle the large amount of information that needs to be captured and stored, a high degree of automation and integration with the processes is required, the dimensions of which exceed the capabilities of existing information systems such as ERP, WMS, etc.

Through collaboration with companies which emphasize high product quality and quality assurance, the outline for a solution to this problem was identified, designed and implemented. Based upon the experience and results from those implementations, products and services were developed that are now being introduced to selected customers in the Consumer Industries market. This is Industrial^{IT} for Track and Trace.

ABB Industrial^{IT} for Track & Trace

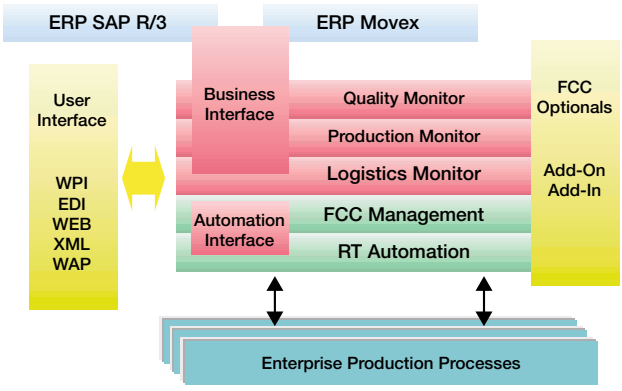
As a key element of its business strategy, ABB has committed itself to a broad program of product development and positioning under the 'Industrial IT' umbrella. This will increase standardization of products as 'building blocks' of larger solutions while building in functionality that will allow multiple products to interact seamlessly as components of real-time automation and information systems. Industrial^{IT} for Track and Trace falls under this umbrella.

In order to achieve the appropriate control of a production and supply chain, information should be monitored and captured in three different areas (platforms): Production, Quality and Logistics. Each of these platforms must be easy customizable to the individual client's products and processes. The necessary quality requirements must be able to be adapted to enterprise and customer standards as they evolve. The platforms must be integrated not only with the process environment (machines, etc) but also with all enterprise management systems (Financial, ERP, etc) and all relevant support systems for planning, logistics, and so on.

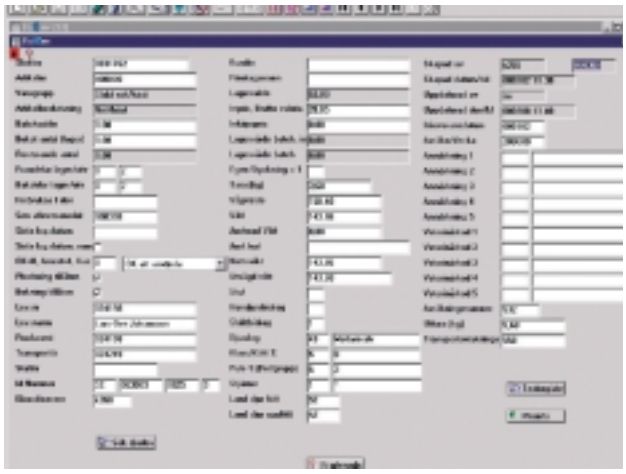
As the information systems environment in most companies is often, in reality, complex and rigid, the platforms should be flexible. They must have a very adaptable interface and they must be able to provide additional logic to transform and adapt the information which is to be integrated.

The platforms must also be able to provide not only full management capabilities right through the production chain, but also communication with participating systems and operators. An implementation in an existing production environment must be made so as to co-exist with, rather than be a substitute for, existing systems.

1 Industrial^{IT} for Track & Trace



2 ELLO T&T IT solution, T&T window



Technology for Industrial^{IT} for Track & Trace

The ABB Track & Trace products themselves are based on transaction handling in a database environment, where the transaction engine is used to operate automatic processes such as data capture and communication. In order to support automated processes and achieve 100% reliability, the main logic resides in the database and every event can be triggered, and action executed, within the database without the participation of any external program 1.

The software is equipped with a version-protected user interface with built-in tools for customizing user interfaces (individual screens and logic) as well as a database (settings and configurations). All settings are saved in the database for upgrade and support purposes.

The solution is based on MS-SQL Server and is fully compatible with Microsoft standards. Access to information and executing database logic can be achieved from any other system (MS-Office, Web, Virtual Basic, Java applications, etc)

Communication can be text-based (XML, EDI, etc) or via direct access to the database (remote operated logic). The basic software is fully maintained and supported by ABB.

A number of options and functions are available as add-ins or add-ons to ensure cost-efficient implementation and a high degree of re-use. Sales and implementation will be promoted through a special training program that will be available to ABB companies.

Implementing Industrial^{IT} for Track & Trace

A number of services have been developed to provide efficient design and implementation of customized solutions. To identify the appropriate solution for the customer's enterprise needs and to provide information for decision-making purposes, pre-projects are performed based upon a well-defined methodology (workshops, checklists, etc). Pre-projects can also be performed on a corporate level to create an enterprise-wide 'standard'. This 'standard' can be distributed and maintained as a specific customer edition by using the so-called VersionProtect functionality. At the same time, it may be modified and customized subject to special conditions (processes, products and levels of integration, etc).

At ELLO, the Swedish abattoir operation, Industrial^{IT} for Track & Trace has been successfully used to achieve 100% control of production and logistics 2. In ELLO, every product is tagged to permit instant, multidimensional track and trace. Every animal that is processed is identified and checked on arrival, and information such as age, origin and history is stored in the central database. After processing, every part of the animal is labeled and sent to a warehouse prior to shipping. All information regarding quality, inspections, laboratory tests and weight is collected and added to the records. Products are assigned on-screen to the appropriate customer order, and shipment routines automatically perform handling and order validation.

Extended logistics track how the animals were brought to the plant. Additional information on products can be automatically forwarded to the customer to establish full control throughout the process chain – from the beginning through the finished-food processing to the consumer.

Solutions based on Industrial^{IT} for Track & Trace technology are already involved in the production of branded high-quality products, like hamburgers for McDonalds (Farlo), and the use of this technology will spread rapidly as industry takes full control of its product and supply chains.

Authors

Knut Andersen
ABB Automation Group Ltd.
CH-8050 Zurich
Switzerland
knut.andersen@ch.abb.com

Jan-Erik Gutman
ABB Automation Systems AB
SE-205 22 Malmö
Sweden
jan-erik.gutman@se.abb.com

Newspaper extracts at start of article:

1. National Post 13/02/2001, By Jill Vardy. (c) 2001, Financial Post
2. Supermarketing 13/11/1998 by Linda Pettit
3. M2 Presswire 6/3/97, (C) 1997 M2 Communications Ltd
4. Grocer 1/6/96 (c) 1996, William Reed Ltd