

White Paper



Solving **Traceability** and **EQM Issues** in the Food Processing Sector

Solving Traceability and EQM Issues in the Food Processing Sector



An Industry Perspective from Donal Deasy, CEO Qualtrace Solutions

Donal Deasy is the man who first propounded the concept of Enterprise Quality Management (EQM). His experience lies in the design and implementation of solutions in areas such as: quality control & certification of raw material and ingredient intake; in-process monitoring & control; positive release procedures for finished product; laboratory systems etc.

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Case Study – United Milk a £45 million greenfield investment

Case Study – Newmarket Cooperative upgrades to EQM

The lord said unto Moses “Yet one more plague will I bring....”

SVD, CSF, Listeria, Foot & Mouth, BSE, Dioxin poisoning, Vomitoxins. The list gets longer, the consumer more alarmed, the media more hysterical and the financial implications for food processors becomes more acute.

The purpose of this White Paper is to remove some of the hysteria. I would like to share with you an insight into the real issues and to demonstrate how practical solutions for forwards-and-backwards traceability are available today. Supporting this view, you will find two current case studies (one a very large scale operation, the other a small business) in the appendix.

Three key messages emerge:

- § It is short-sighted and potentially costly to address Traceability in isolation. If, however, it becomes part of a Enterprise Quality Management (EQM) strategy, the financial benefits are significant. Backing this up, I quote extensively from a recent study, published by international management consultants, ARC Advisory Group, that details a real-life implementation that achieves a payback period of less than 12 months

Introduction

§ Whilst there is no shortage of stand-alone solutions addressing individual aspects of traceability within the food chain, the real challenge is to integrate all the disparate information currently locked into mainstream computing applications, laboratory information systems, paper-based records, process control systems and so on. There is an answer.

§ It is not necessary to start with a 'green field' operation. EQM and associated traceability can be implemented into an existing operation with some minor physical and operational adjustments.

I do hope you find this paper useful. If you would like to pursue the topic further, or would like to know how Qualtrace Solutions might help you in your operation, please contact us on +353 (0)21 4912139 or e-mail eodriscoll@qualtrace.com

A handwritten signature in blue ink that reads "Donald J. Peary". The signature is written in a cursive style with a large, looped initial 'D' and a stylized 'P'.

1 The food safety challenge

He crams with cans of poisoned meat

The subjects of the King

And when they die by thousands

Why, he laughs like anything

Song against Grocers, G K Chesterton

1 The food safety challenge

The fact that you are reading this White Paper suggests that it is hardly necessary for me to rehearse the pressures the food industry is facing. Nevertheless, it is useful to spend a few moments reminding ourselves of the very considerable climate of change and examining the increased magnitude of risk.

We are experiencing ever increasing consumer and legislative emphasis on both quality and safety, while new EC directives are multiplying the pressure exponentially. Recent food safety scares have highlighted two interesting trends. First the ability of government and NGOs to make off the cuff decisions before the full facts are available or without necessarily having thought through the longer term consequences. Secondly, the media's ability to fuel consumer (and government) panic.

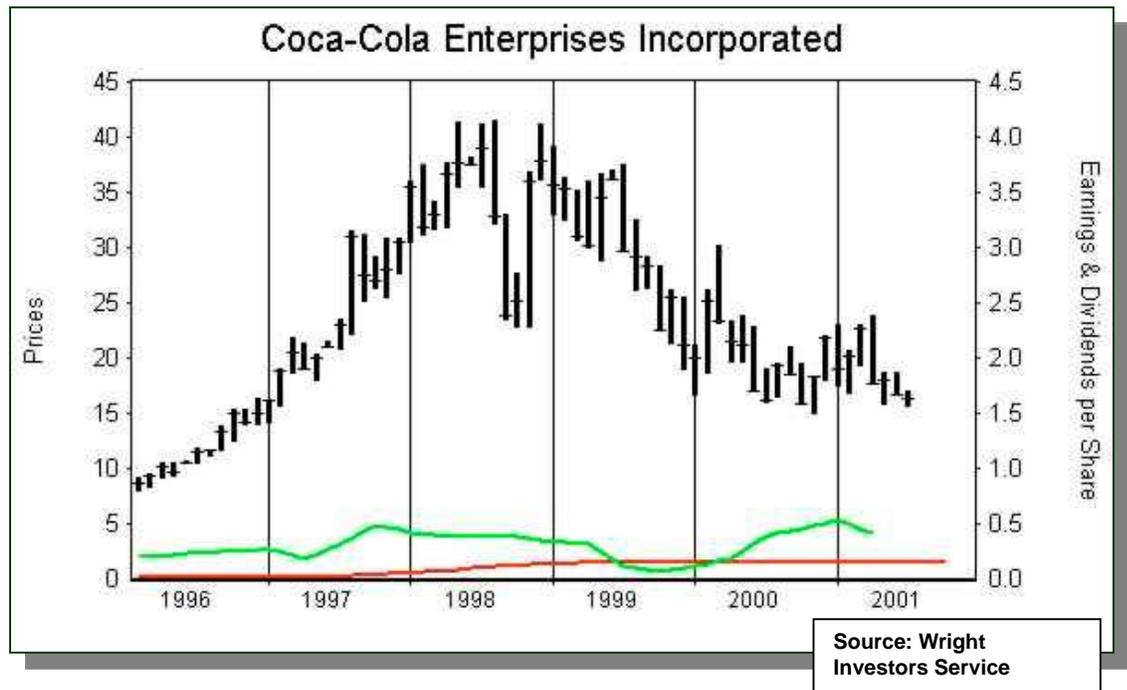
“The poor handling of a serious incident within a company can cause irreparable damage to the company, to the brand or even the industry, and certainly to the reputation of those in key positions”

This new and increasing trend can spell disaster. Robert Bartlett puts it succinctly in ‘Dancing with the Devil’: “The poor handling of a serious incident within a company can cause irreparable damage to the company, to the brand or even the industry, and certainly to the reputation of those in key positions”

1 The food safety challenge

If that sounds strong stuff, just consider two recent examples :

Coca-Cola



When Coca-Cola became embroiled in a safety scare in 1999, they were unable to supply the relevant batch numbers quickly enough to the retailers - who subsequently removed all of the product from their shelves. The company's response was seen as slow. Belgium and France banned sales and 17 million cases of the drink were withdrawn from the market with a total recall cost of \$66 million.

The truly alarming outcome, though, has been the long term effect on stock market valuation. You will see from the graph above that (predictably) share price plummeted, wiping out 50% of the company's valuation. The salutary lesson is that two years later, well after the event has become history, market valuation has simply not recovered.

1 The food safety challenge

Snowbrand

Snowbrand, Japan's largest dairy company suffered a widely publicised food poisoning outbreak last year, sparked off by a contaminated milk powder ingredient. The company lost \$91.5 million between April and July 2000 after the outbreak had affected 13,000 of its customers. Unable to identify the contaminated batches accurately, Snowbrand was forced to withdraw all of its products from the retailers' shelves and shut down 21 plants for 40 days. The lost sales and closed plants naturally had a serious impact on the financial health of the company. Snowbrand's shares were hard hit by the crisis. The share price is down from 619Yen before the crisis, to 360Yen today. It also led to the resignation of the company's president and seven other top executives - and they face charges of professional negligence.

*The scandal led to the resignation of the company's president and seven other top executives
They face charges of professional negligence.*

The scandal had an impact on the entire industry in Japan. - A consumer confidence survey by Japan's Economic Planning Agency in August 2000, found that the scandal had turned the Japanese against all milk products and contributed to an overall uncertainty about future economic conditions.

The challenge, then is being able to :

- § Improve product safety.
- § Implement risk management and rapid response capabilities.
- § Manage quality from source to finished product and then to consumer.
- § Achieve full, verifiable, backward-and-forward traceability.

Rapid Response & Crisis Management

*The shopping trolley is one of the most potent weapons
on the face of the earth...”*

EU Commissioner, David Byrne, Jan 2000

2 Rapid Response & Crisis Management

Our opening chapter 'The food safety challenge' touched upon the issue of shareholder confidence subsequent to a crisis. In this section, I look a little more closely at the implications of a food crisis, the need for a rapid response and a well-planned and rehearsed crisis management strategy.

The problem with discussing such issues in isolation is that it is so easy to lose sight of the appalling realities. As an exercise, I would like you, right now, to think of your own company and then imagine that the phone rings... only to inform you that it has just emerged that some time in the last three weeks the plant has processed some contaminated product.

- § How would you locate and isolate the suspect batches?
- § How quickly could you do it?
- § Would you be able to demonstrate publicly - within hours - that you had the situation under control?
- § How would you protect consumers?
- § How would you minimise the damage to your company, your brand, your personal reputation?

When needed, the most important deliverable is speed of information back to the retail customer and the enforcement authorities

Your best defences in a crisis are responsiveness and preparedness.

You can control the scale, extent and severity of the crisis by removing the affected product from the market as quickly as possible. The quicker you remove it, the less adverse media attention you will receive.

2 Rapid Response & Crisis Management

To do this, you need to be able to:

- § Immediately and accurately identify the affected batches and their distribution.
- § Identify the stages at which the problem has occurred.
- § Demonstrate the accuracy and comprehensiveness of your records.

If you are prepared, the crisis can be averted without risk to consumers and without losing customer confidence

Without comprehensive supporting data, a product recall will necessarily extend beyond what may in fact be a relatively small case of contamination. A successful recall should involve a minimum number of products. The more unnecessary products that get caught up in the recall, the greater the cost to the business.

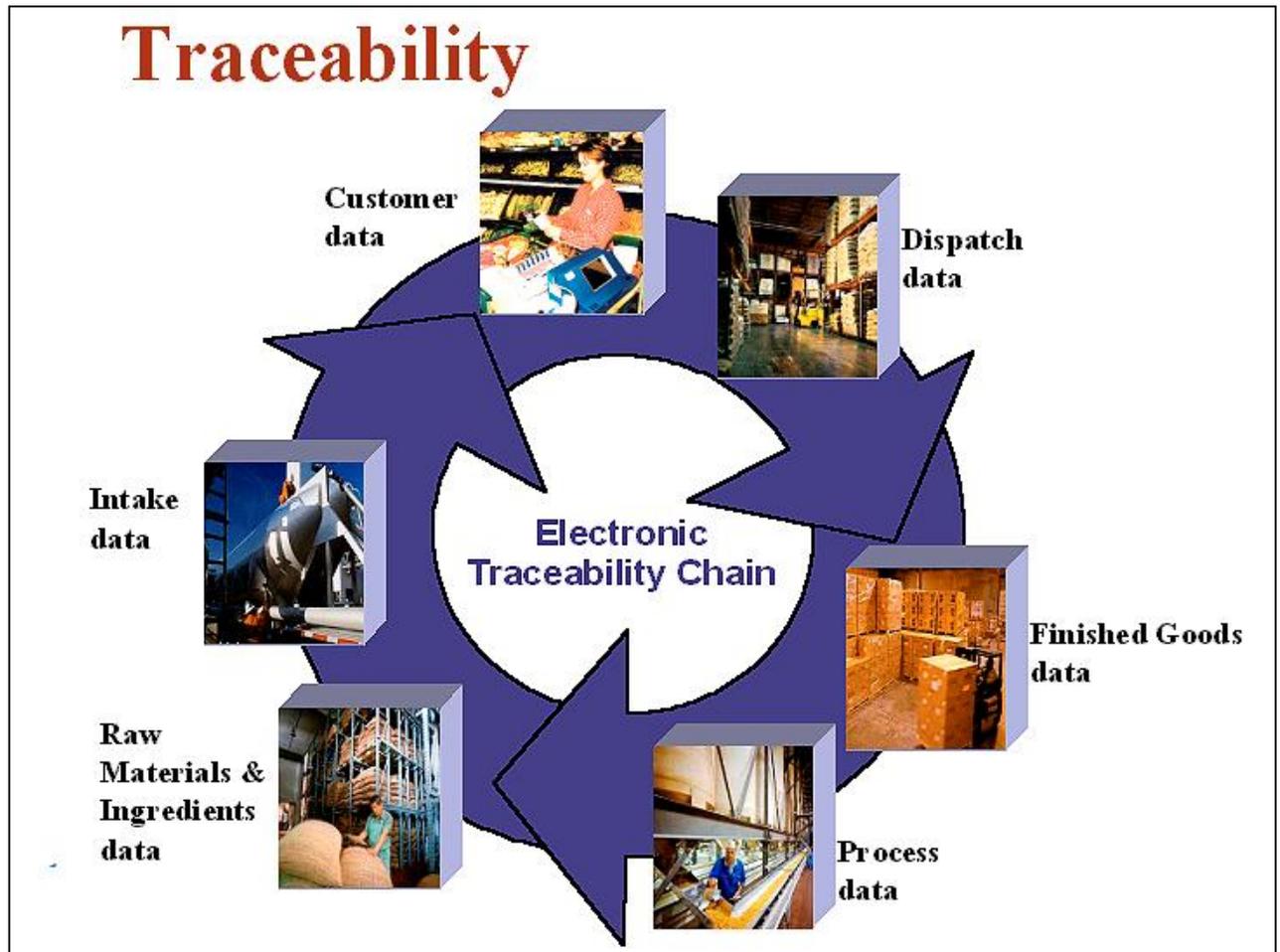
In the following sections I examine the realities of maintaining traceability. I explore the need for plant integration and describe the concept of Enterprise Quality Management within the food sector. I also show how an investment in EQM can enjoy a payback period of less than 12 months.

3 Traceability

“I’m afraid you’ve got a bad egg, Mr Jones.”

“Oh no, my Lord, I assure you! Parts of it are excellent!”

Punch vol cix 1895



“A successful food policy demands the traceability of feed and food and their ingredients.”

The industry has not been slow in recognising the challenges, the urgency or the fact that traceability is the dominant issue. The European Commission’s White Paper on food safety sums up: “A successful food policy demands the traceability of feed and food and their ingredients.”

A number of initiatives have been launched but, like the Curate’s egg, the results are very mixed. In the main, they address elements of the food cycle but do not address the need for rapid *backwards-and-forwards* traceability.

3 Traceability

Backward traceability means being able to :

- § Receive external notification of a quality breakdown with a product.
- § Easily trace the affected product / batch backwards through the process and rapidly identify all relevant data from each stage in your process - start to finish.

Forward traceability means being able to :

- § Immediately identify all finished product batches containing an identified risk such as a contaminated ingredient, foreign matter etc.
- § Being able to establish their instore or dispatched location.
- § And rapidly instigate a product recall.

Obvious, really. So what's the problem? The problem is – *the traceability gap!*

4 The traceability gap

*'Oh where are you going?' said reader to rider,
that valley is fatal where furnaces burn,
yonder's the midden who's odours will madden,
that gap is the grave...*

Five Songs, W H Auden

4 The traceability gap

Clearly, the key to traceability, rapid response and crisis management is *speedy access to all relevant data*. Inevitably, this encompasses a wide range of types of data from different sources:

Customer Data: full customer details and all other dispatches from the same product / batch.

Dispatch Data: all dispatches associated with the specified product batch, including transport / delivery details, storage, quality release data and certificate of analysis.

Finished Goods Data: the finished goods analysis results along with the particular customer's product specifications, all relevant packing data and the bulk product source.

Process Manufacturing Data: all manufacturing and blend records associated with the product/batches; all associated laboratory data; CIP records, calibration and downtime analysis etc.

Raw Materials / Ingredients Data: raw material and ingredient batch usage for the specified product/batch.

Intake Data: supplier delivery data; all intake records, together with integrated quality control and laboratory data.

4 The traceability gap

In many of today's plants, it is extremely difficult to maintain the data links and achieve the degree of data integration necessary for compliance with key quality standards and the emerging FDA-type regulations in Europe.

Anyone who has tried to bring together such diverse information as customer, dispatch, finished goods, process, raw materials and intake data, held in disparate systems, will be aware of the significant problems. Different types of information are isolated and held in 'data islands'. Not all of the information is available electronically as paper-based records are still common in key parts of the information chain. This is what I mean by the 'traceability gap'.

Gaps in the traceability chain exist primarily because quality and traceability have historically been regarded as an adjunct rather than an integral component of the manufacturing process. Older plants were designed at a time when throughput and hygienic processing, rather than traceability, were the dominant issues.

In many of today's plants, it is extremely difficult to maintain the data links and achieve the degree of data integration necessary for compliance with key quality standards and the emerging FDA-type regulations in Europe. Traceability demands that *quality data* is integrated with all operational areas.

Quality management is much more than just a Laboratory Information Management System. In fact, laboratory systems are probably the most common form of data island - electronically isolated from goods inwards receipts, raw material release into the process, production monitoring and packing. Consequently, there is a heavy reliance on paper systems when tracing a batch from raw material through to the retailer's shelf.

4 The traceability gap

Paper records are completely inadequate in a crisis. They are frequently illegible, missing, inaccurate and may not be contemporaneous.

When a typical plant has a quality audit, or suffers a safety problem, an army of people has to search physical archives, laboriously negotiating a paper document-chain for the information necessary to manage the crisis and minimise the damage. During the time this takes, the client's confidence is dipping fast.

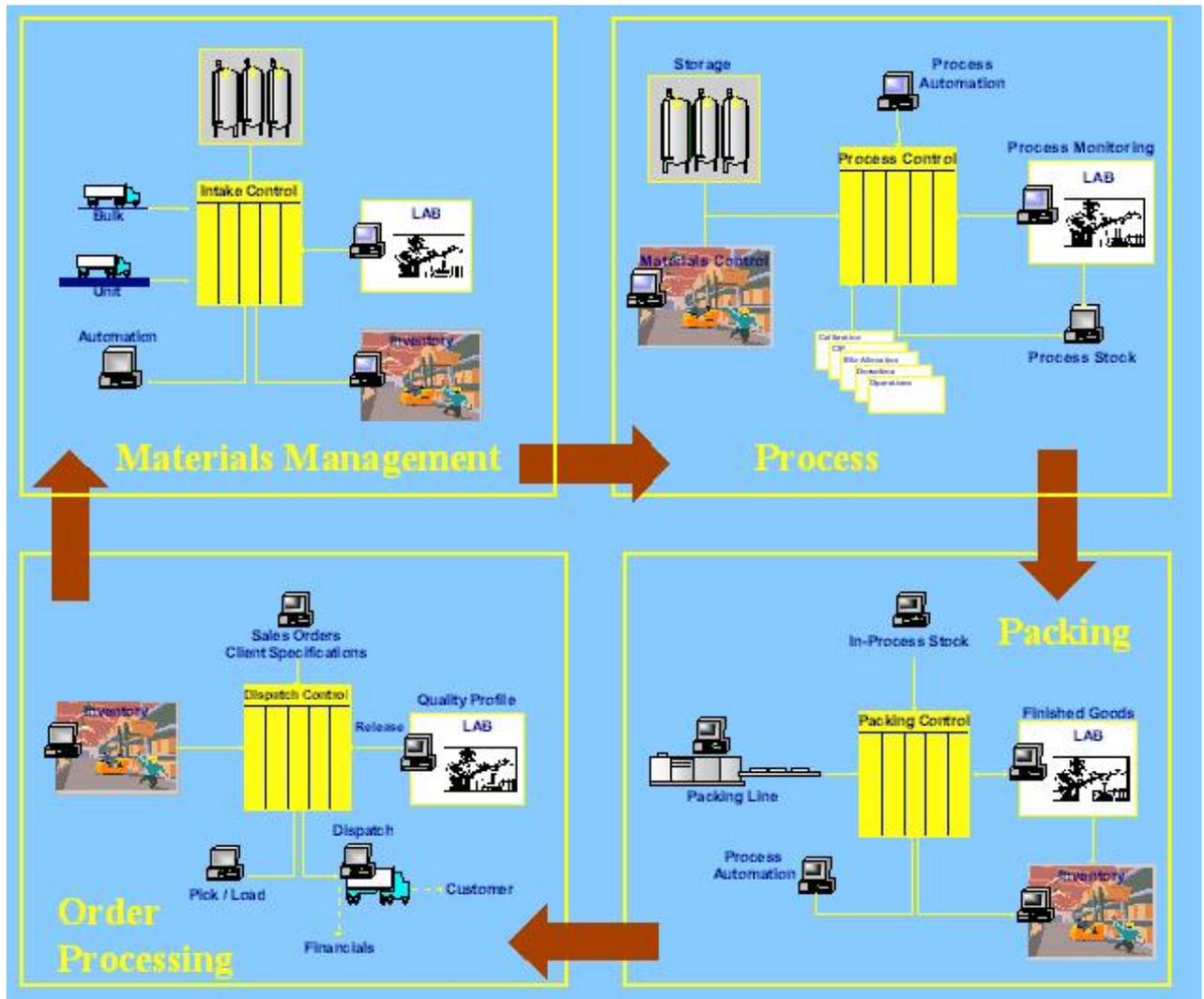
Only when quality management systems are integrated into the heart of the IT systems, on an equal footing with say the financial systems, fully integrated into each stage of the process, is it possible to have an electronic solution to forward-and-backwards traceability in minutes.

5 Plant Integration / EQM

Integration: completeness, totality – perfection!

Roget's Thesaurus

5 Plant Integration / EQM



Data integration really equates to plant integration. The question arises as to whether meeting today's most pressing challenges will demand a completely re-engineered plant. Undoubtedly, more and more companies are adopting this approach - by building new plants from greenfield sites. This is not the only option, however. With some physical and operational changes and the introduction of an Enterprise Quality Management (EQM) system, full integration and traceability can be achieved - as we shall see in the section 'How can QualTrace help?'

5 Plant Integration / EQM

In addressing the question of integration it is useful to consider four key areas and examine how they contribute to the traceability gap. The areas are:

- § Raw material and batch control
- § Raw material release into the process
- § Packing
- § Order processing and dispatch

Raw Material Management and Batch Control

Having comprehensive control over all ingredients and deliveries has a significant bearing on your rapid response capabilities.

Raw materials management and batch control is the first link in the traceability chain.

In many of today's plants:

- § Materials management is not real time but historical.
- § Incoming raw material and batch control is largely undertaken on an inventory only basis.
- § Quantity and batch information is not integrated real-time with the laboratory data.
- § Silo or tank storage and control is handled either manually or by a SCADA system - typically a standalone system.

5 Plant Integration / EQM

- § Batch control of raw materials and ingredients normally resides in the business system. The result being a serious lack of integration from system to system.

If you are unable strictly to control and validate the release of materials into the process then you have already broken the traceability chain.

The key to effective control of materials lies in integrating every aspect of materials management into a single, central EQM database. This enables real-time validation and control, and guarantees full electronic traceability from raw material intake to the manufacturing process.

Raw Material Release into the Process

The release of raw materials into the process is the second link in the traceability chain. To achieve traceability you need to be able to track materials, blends, mixes etc released into the process from the materials management stage. Again, the key is real-time validation. It is here that many plants lose traceability. Traditionally integrated IT systems or functionality have not been available in this area, which has meant that gaps developed between materials management and the process manufacturing systems. So often, the connection between the raw materials and the process is an unvalidated paper link.

5 Plant Integration / EQM

The issue here is how best to follow materials into the process to ensure that the data chain is maintained.

Having a central Process Control record is critical to maintaining the data chain.

Having a central *Process Control record* is critical to maintaining the data chain. It acts as the control centre for all data relating to the batch, such as SCADA, Cleaning In Place, Laboratory data, material batches and so on. The message is clear - for effective quality management, quality-related data has to be fully integrated real-time with all operational areas.

Packing

The Packing stage is the next link. Having created a bulk product, it is now necessary to trace the WIP bulk stock out of the process - whilst maintaining the traceability chain.

This entails pulling traceability records from the previous stages - process manufacturing and materials management and holding a total quality profile of all finished product (sampled at the appropriate frequency).

Problems that arise in the area of packing vary from business to business. One challenge is the difficulty in identifying the bulk finished product source. Continuous processes present their own problems. For example powder ingredients are often sequentially loaded into bulk silos, making it difficult to trace them back to the specific source. Such problems can be minimised by fully integrating SCADA and IT systems to maximise the levels of traceability possible. A fully

5 Plant Integration / EQM

integrated electronic data chain can provide levels of traceability that are impossible to achieve with paper systems.

In most existing plants, key process manufacturing and packing data is held in a number of disparate IT systems as well as in a series of manual records, such as HACCP and quality check lists. The end result is a broken data chain unsuited to the task of extending traceability from raw material to packed product.

In most existing plants, key process manufacturing and packing data is held in a number of disparate IT systems as well as in a series of manual records, such as HACCP and quality check lists. The end result is a broken data chain unsuited to the task of extending traceability from raw material to packed product. To provide the vital link between the bulk finished products and their physical packing it is necessary for that all relevant information be channeled into a central enterprise quality management system. This system must be capable of handling data to sub-batch level, of tracking all product movements by quantity and batch code, and holding a comprehensive profile of the data down to operator level.

Real-time validation not only guarantees that the traceability chain remains intact, it also protects against compromise by oversight or human error.

Order Processing & Dispatch

In most plants this final link in the traceability data chain - dealing with the customer - is financial and supply chain driven rather than quality and traceability driven.

To maximise traceability, as well as improve profits – it is essential to be able to select product that exactly matches customer specifications. This is especially true in the Dairy and Ingredients sectors that can have complex grading based

5 Plant Integration / EQM

EQM:

integrates quality and supply chain systems to guarantee the highest possible standards of product safety

closes the information gap between process automation and business systems

uses real-time validation to ensure compliance with quality procedures

maintains the integrity of the traceability chain.

on chemical, microbiological and functional analysis. Integrating an EQM system with the ERP's supply chain functionality forges the final link in the traceability chain from dispatch back through the manufacturing process to the materials intake stage. Integrating EQM with business processes helps maximise the value of production.

Full integration of the Enterprise Quality Management, resource planning and plant automation systems, can provide accurate information on stock availability, a comprehensive quality profile of all products manufactured, enhanced planning data and immediate access to information for plant performance analysis.

6 Return on Investment

With a payback period of less than one year, I would suggest to you that there is no cost!

– Donal Deasy interviewed by BBC's Peter Wheeler

6 Return on Investment

The return on investment from integrating quality management into the mainstream business applications is remarkable. Rather than my making such a bold statement, I am printing below an extract from a report ‘Enterprise Quality Management delivers 1 year Payback’, published by ARC Advisory Group August 27th 2001.

The ARC Advisory Group is acknowledged as a global leader in assessing IT and management strategies. They have offices in USA, Germany, India, UK, Japan and Argentina

Extract from Enterprise Quality Management delivers 1 year Payback

BY SIMON BRAGG

AUGUST 27, 2001

ISSUE:

European consumers are demanding higher food standards. Many software suppliers, especially ERP suppliers, do not support users requirements for traceability (termed genealogy in the US).

Manufacturers in food and beverage are not just implementing traceability as an “insurance policy” against product failure, but are finding such Enterprise Quality Management systems offer rapid payback.

6 Return on Investment

SUMMARY:

Enterprise Quality Management (EQM) systems deliver 1-year payback through optimizing product values, headcount reductions, and supporting superior plant management. In addition, companies with EQM systems can expect market share gains, improved delivery performance and possibly enhanced share price performance.

Good systems should support sub-lot traceability, splitting and combining lots, and yield analysis. Traditional quality control systems use paper logbooks, and require production operators to note every material movement and key equipment settings. Frequently, logbooks are illegible, cumbersome to use, and ineffective during a product recall. Consequently, many traceability system implementations have been justified as an insurance policy, i.e., that in the event of a product defect, a manufacturer would handle it smoothly.

A new breed of Enterprise Quality Management systems offer more than a 'cost of doing business' insurance policy, and deliver payback within a year. These systems combine the functionality of laboratory information management systems (LIMS) and a Collaborative Production Management (CPM) system. Typically they sit on top of a SCADA system, and integrate with the ERP system.

6 Return on Investment

Look to the following processes and cost buckets to identify areas where EQM systems improve performance:

Product Value Optimization: Process manufacturing tends to produce product of variable grades, and major customers order against their own specifications. Good traceability systems identify product characteristics at the sub-lot or even the pallet level. The ability to match customers' specifications against the characteristics of available pallets means that higher specification product can be sold to other customers for higher values.

Market Share Gains: Traceability differentiates commodity products in competitive marketplaces. In the UK, two start up milk processing companies: United Milk and Amelca, are building new plants that will together process 7.5% of the UK entire milk production. Demand for most milk products is falling, and there has been significant rationalization of processing capacity during the last decade. However, both these companies plan to succeed though offering superior traceability, since few other milk processors can trace from a pallet back to a particular farm.

Headcount Savings: Through automating data collection, recording and analysis, one medium sized food manufacturer calculated it would save 15 people per production line, or around \$700,000 per annum. These savings do feed through to the bottom line, since their labour turnover was 10% per annum.

Superior Plant Management: Yield losses can exceed 15% in some food manufacturing processes. The cost of failure is significantly higher than the raw material costs, or the lost

6 Return on Investment

revenue, since waste disposal costs add an additional \$15 per tonne. In addition, there are savings in reduced customer complaints and in handling product returns.

Paper based quality systems cannot support an analysis of manufacturing performance, to identify the source of the problems, such as incorrect equipment settings. Good EQM systems create the performance analysis that enables manufacturers to reduce yield losses by a third.

Improved Delivery Performance: Some food industry QA tests require 4 days, and occasionally another 2 days to confirm borderline results. Companies lacking reliable traceability procedures hold finished product in final good dispatch whilst waiting for test results. Companies confident of their traceability system can hot-ship. Hot shipping means transporting product while the lab completes quality checks, so that the final grade is confirmed before the truck reaches the customer's door. This can reduce delivery lead times by a third.

Share Price Performance: Management's ability to respond to a food safety crisis can impress equity analysts. During the first few days of a crisis, analysts rapidly decide if the company will recover, and their hunch is often surprisingly accurate. The share price of companies that subsequently recover initially falls around 5%, compared to an 11% fall for those that don't recover. 50 trading days later, shares in those that don't recover remain about 5% down, and fall around 15% during the next year. Shares in those that do recover gain about 5% during the subsequent 50 trading days, because analysts positively reassess management's competence and ability to handle difficult challenges.

7 Whither ERP?

Things are not what they seem.

Longfellow

7 Whither ERP?

A major UK food processor revealed to us that their ERP solution cost 1.5 % of annual turnover. Getting it to address traceability added a further 2.5%.

They have publicly stated that adopting the Qualtrace approach would have been faster and very considerably less costly.

If integration is the key, it begs the question – to what extent do ERP systems meet your traceability, rapid response and crisis management needs?

ERP systems have had some success in integrating mainstream computing applications, as well as adding e-commerce capabilities. Unfortunately, they tend to suffer from what I call the ‘basement syndrome’.

By this, I mean that they have been remarkably successful in addressing the needs of the 12th and the 13th floors – such things as financial management and control, sales order processing, stock control and customer relationship management. They have also addressed many of the needs of the 14th floor – executive information systems and business intelligence. Where they become flaky is further down the organisation and none has really succeeded in addressing the basement where murky things like quality control, quality management, process control, laboratory information systems, and so on, operate in splendid isolation.

The whole approach to enterprise-wide solutions has recently undergone considerable change. Today companies recognise the value of adopting best of breed solutions for highly specialised requirements, provided they can be integrated into the overall IT infrastructure. Interestingly, this new philosophy is being welcomed by leading ERP solutions suppliers, who recognise the commercial advantage of co-operation with specialists – particularly those addressing the ‘basement’ applications. As an example Intenia, the e-collaboration solutions company, signed a partnership agreement with Qualtrace to offer a fully integrated solution for the supply chain that directly addresses the traceability issue.

8 How Qualtracé can help

“We were very impressed with Qualtracé and the significant role they can play. We appreciate their energy, their industry knowledge and their single-minded focus on enterprise quality management, of which traceability is just a part.”

Don Morris, CEO, United Milk

8 How Qualtrace can help

It will come as no surprise that Qualtrace Solutions is ideally equipped to assist you in your EQM and traceability initiatives (our motives in publishing this White Paper are not wholly altruistic!).

The company has specialised in quality management systems in the food sector for 15 years and was the first to define the concept of EQM.

The Qualtrace solution

QualTrace EQM supports best practice in the manufacturing process to insure that quality and validation rules are adhered to and that the data chain from a traceability and quality point of view is always maintained.

QualTrace manages quality throughout the entire manufacturing process, tracking and integrating from source to finished product by fully combining laboratory data with raw material intake and validation, process control, packing, finished goods, dispatch and customer response information. While QualTrace can be implemented as a stand-alone quality and traceability solution, greater benefits can be achieved when it is integrated with business and process automation systems.

QualTrace is easy to integrate with existing technology and can be used to bridge the traceability gap between ERP and plant automation systems. The beauty of QualTrace is that it links all of this information to create one, fully integrated system.

Qualtrace is easy to integrate with existing technology and can be used to bridge the traceability gap between ERP and plant automation systems

8 How Qualtrace can help

Integration methodology

What Qualtrace Solutions has been able to achieve is a family of patented aids to integrate disparate software solutions, - eg. plant automation, laboratory and back office commercial systems – across different hardware platforms and operating systems.

This proven methodology eliminates the risk associated with developing in-house integration solutions and is more cost effective by an order of magnitude

This proven methodology eliminates the risk associated with developing in-house integration solutions and is more cost effective by an order of magnitude.

QualTrace EQM is flexible, open platform software capable of evolving to meet future needs and challenges.

Modular implementation

Based on the expertise we have developed over the years, we are able to provide modular implementations. This enables customers to address first those areas of greatest concern within their own operation. The pace of implementing each stage is determined by the customer, adopting an ‘evolution rather than revolution’ strategy.

8 How Qualtrace can help

Greenfield vs existing plant

We have experience in implementing systems within a greenfield development as well as within existing facilities.

Consultancy & turnkey implementation

We compliment QualTrace EQM with a range of professional and customer care services including:

- § Consultancy
- § Needs assessment
- § Project management
- § Software Development
- § System Configuration
- § Implementation
- § Customised training
- § Ongoing technical support

Our Project Managers, Business and Technical Consultants work with customers to document existing processes, identify core processes, highlight and agree areas for reengineering, and implement the key processes to deliver early business benefits.

To guarantee a smooth implementation, Qualtrace Solution's experienced trainers devise and deliver detailed training programmes, tailored to each customer's specific requirements.

8 How Qualtrace can help

The team

The Qualtrace Solutions team is made up of people with the optimum mix of technical skills and food industry experience. Our managers, systems analysts, software engineers, customer care, installation, training and quality personnel have developed specialist knowledge in quality management and traceability. This means that we are uniquely placed to provide our customers with a competitive, best-of-breed software solution, reinforced by industry expertise and comprehensive support. We adhere to rigorous development standards, test and software release procedures and work closely with customers to document their specific system requirements, identify core areas and emphasize speed and clarity of purpose in implementing a working solution.

APPENDIX

The proof is in the pudding...

Lewis Carroll

APPENDIX

EQM is equally relevant to large and small enterprises. In this appendix we report on two of our latest implementations – one a £45 million, state-of-the art milk processing plant, the other a small, specialist cheese processing co-operative.

United Milk

United Milk is a recently formed farmers' co-operative whose new £45 million plant will process 850 million litres of milk a year (nearly 6% of UK milk production). Its objectives:

- § To be the most efficient milk processing plant in Europe.
- § To achieve full forward and backward traceability for product and plant equipment – from cattle feed to milk powder, from collection tanker to bagging.
- § To provide internet integration for farmers, suppliers and customers.
- § To achieve minimal environmental load.

United Milk's fully integrated system ensures that they know, for any pallet of powdered milk, when and which evaporator, pasteuriser, separator and silo was involved, as well as which tankers collected the milk, from which farms and when.

The plant needs to be efficient – it offers dairy farmers, its investing shareholders, 1.3 pence per litre above the intervention price. This is particularly relevant in a business environment where competing processors have traditionally driven raw milk prices down (the UK dairy industry has no real history of vertical integration) and the end products are experiencing flat demand. The company's competitive advantage, in a commodity market, is that it will offer customers complete product traceability.

APPENDIX

“QualTrace have impressed us with their knowledge and innovation in terms of the system they offer --- and they provide a unique package which doesn’t seem to be available from other software vendors”

Don Morris, CEO United Milk

For every batch, QualTrace EQM tracks all equipment used, the key performance events for each instrument and provides a trend analysis for the continuous monitoring of plant performance. It tracks powder through the evaporation and drying process to the bagging lines. Quality data is fully integrated with all other operational areas to provide a comprehensive quality profile on the batch and maintain the integrity of the traceability chain.

United Milk also offers any authorised partner within the supply chain Internet access to the full traceability data on any batch. This data is available within minutes. In addition, QualTrace validates data entered into the system in real time, ensuring compliance with quality and traceability rules and procedures.

Location	Data
Truck at Farm	Farm, Temperature, quantity taken, acidity
Truck In Weighbridge	Tanker weight, truck, route
Truck at CIP	Cleaning record & program
Truck at Out Weighbridge	Tanker weight
Milk in Silo	ID, holding conditions
Laboratory	Protein and fat content
Liquid Processing	Silo, separator, pasturiser, dryer ID, temperature etc.
Dryer	Moisture, fat, protein content
Butter	Moisture, fat, salt content
Bagging line	Bar code pallets, sample powder every pallet.
Outbound warehouse	Storage location, grade
Effluent	Quantity, volume

APPENDIX

For each supplier's farm, QualTrace stores protein and fat content data based on analysis of the milk sample. QualTrace also calculates the tanker composite sample, which is the overall protein and fat content of the milk in the tanker. In addition, QualTrace collects data from every piece of equipment, so that all milk movements within United Milk's Westbury plant are recorded. With this data, United Milk can:

*Payback period has been
independently assessed at less than
12 months*

- § Every day, determine the mass balance and milk
- § yield without waiting for third party laboratory results, which usually take up to 1 week. A completely independent laboratory will, however, determine farmer's payment criteria. After every production run, United Milk knows the theoretical and the actual yield – how much milk powder should have been produced, given the characteristics of the raw milk, compared to the quantity of milk powder actually produced.
- § Calculate the most profitable combination of products to manufacture based on their knowledge of milk stocks as well as butter and milk powder prices.
- § Operate dryers at peak efficiency, since QualTrace provides a trend analysis to process control operators.
- § Identify the most efficient configuration of pasteurisers, separators, and dryers, given the quality and yield after every production run.
- § Establish the quality and grade of every pallet, and optimize matching of available product to customer specifications.
- § Minimize downgrading and wastage if a problem emerges. United Milk samples milk powder at the point of bagging. Typically plants bag the powder, then wastefully re-open the bag, extract a sample, and reseal the bag.

Acknowledgement: ARC White Paper – How United Milk wins with integrated systems - March 2001

APPENDIX

Newmarket Co-operative

Newmarket Cooperative has installed QualTrace as a cheese production and traceability solution at their manufacturing facility in Cork.

Newmarket produces 10,000 tonnes of cheddar a year for speciality food companies and export markets. QualTrace tracks and integrates all quality, grading, process and inventory data and provides the Co-op with a significant competitive advantage in the form of full electronic traceability from farm collection to tanker, silo, in-process batches, finished daycode batches of cheese, stock and customer dispatches.

Newmarket and Qualtrace Solutions have had a long standing relationship. For a number of years the Co-op has used QualTrace's earlier DOS-based Quality Management System to meet its quality, traceability, yield and risk management requirements. The decision to upgrade to the latest QualTrace suite was, according to Pat Buckley, Newmarket's production manager, taken against a background of increasing regulatory and commercial challenges.

APPENDIX

'Today the emphasis is on verification and on speed,' said Buckley. 'Providing a service to our customers that includes the guarantee of a high quality, fully traceable product is vital. Being able to quickly demonstrate full traceability, as well as rapid response and product recall capabilities, will more and more become the key to gaining a competitive advantage. We are implementing a system that integrates our quality information with all other operational areas provides us with traceability from the farm to the finished product at the touch of a button.'

At Newmarket, the QualTrace MilkData, Weighbridge and LIMS modules are used to control and trace all raw materials received and released into the process. Their integration with the In-Process module extends the traceability to the in-process batches and bulk finished product. This allows Newmarket to track all product movements by quantity and batch code and provides a full profile of the data held on each batch. Integration of the In-Process, Packing and Inventory modules establishes an electronic link between the process control, packing, quality and stock records and completes the production traceability chain on finished goods to pack and pallet level. The Inventory module holds a quality and grading profile of all stock to sub-batch level for matching to customer specifications. Traceability to the customer is maintained to unit level within the batch - completing the electronic traceability chain from source to customer.

Newmarket selected QualTrace having evaluated a number of alternative systems. According to Jeffrey Collins, quality manager for Newmarket Co-op, none of the other systems on offer could match the functionality or the level of data integration and information management provided by QualTrace.

APPENDIX

'We looked at a number of off-the-shelf packages but we really felt they were only suitable for lab work,' said Collins. 'We really need our information to be up to the minute and accessible in real time and very few systems offered this. Some packages had individual databases for modules which made accessing data messy and there were too many gaps in the system, where you had to combine a paper traceability chain with a computer-based one. We can't afford to have any paper trails. With this system as soon as information is keyed in another member of staff can access it, making all our quality control processes not only easy to track, but easy to document as well.'

Acknowledgement: TechCentral May 2001