Resilience in the Food Chain: A Study of Business Continuity Management in the Food and Drink Industry

Final Report to the Department for Environment, Food and Rural Affairs

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Executive Summary

This report presents the findings of a one-year study to assess the resilience of the retail food and drink supply chains in England. The research was commissioned by the Department for Environment, Food & Rural Affairs (Defra). Its purpose is to contribute towards 'evidence-based' policy making in relation to Defra's responsibilities as Lead Government Department for food and drink supply, under the Cabinet Office Capabilities Programme (Cabinet Office 2006).

An emergency is defined here in line with the Civil Contingencies Act (2004) as *"an event or situation which threatens serious damage to human welfare"*. Disruption to the supply of money, food, water, energy, fuel, communications or transport, as well as terrorism, are all situations deemed to pose such a threat.

The research is part of a wider programme of work underway within government to improve its ability to deal with the effects of systemic 'creeping crises' such as livestock diseases, pandemics or fuel shortages, as well as site-specific sudden onset emergencies (natural disasters or terrorist attacks etc).

The aim of this study is to ascertain the current state of Business Continuity Management (BCM) in the food & drink industry; in particular, the scope, extent and limitations of continuity planning, practices and procedures within organisations engaged in the supply of a limited number of key product categories. The work takes a systems-based approach, and involves some of the county's leading supermarket chains, wholesalers, food and drink manufacturing companies, their suppliers and transport providers, together with a number of industry associations.

A total of 61 senior managers from 28 organisations contributed directly to this report. Most of the organisations were amongst the biggest, best-known and best-resourced companies in the industry, in the UK and around the world. Three were small independent retailers. The report is constructed and presented in a way that is designed to protect the identities of individuals and their organisations, whilst allowing the managers' own voices to be heard. All quotations presented have been verified by the original source(s) as fair representations of their view(s) and approved from inclusion in this report.

The current state of BCM in the Food & Drink Industry

The current state of BCM amongst the organisations studied varies, but the findings of this study indicate that:

- Business Continuity was recognised as a rising discipline and is a growing concern within all participating organisations.

- BCM was still in the early stages of implementation. Most organisations readily conceded they were not in the vanguard of current best practice.

- All organisations had some form of IT-related continuity planning/disaster recovery in place.

- Most companies were pursuing wider operational risk management programmes, for reasons of compliance.

- Risk management processes established for Corporate Governance, Food Safety or Health and Safety purposes formed the basis of BCM.

- Few of the companies had moved beyond reactive crisis management to proactive or preventative BCM.

- Resource constraints (money and manpower) and lack of expertise were slowing BCM implementation. Companies are reluctant to invest in costly preventative measures or redundancy within their operations 'just-in-case'.

- Tools are available to assist BCM implementation (e.g. the emergent British Standard), but these were not widely used, partly because managers were not aware of their existence.

The emphasis of BCM changes between sectors, reflecting the core activities and commercial concerns of each.

- Larger retailers are inherently resilient because few of their assets are mission critical. Their networks can withstand the loss of any store and any product supplier without significant disruption to operations. Their distribution centres (DCs), Head Offices and service suppliers are more likely to create single or significant points of failure. However, the retailers' principal asset and concern is their brand reputation. For all other eventualities (barring fuel shortages), the retailers look to their suppliers to provide cover as their first option contingency, expecting their suppliers to hold redundant capacity/capability and provide the logistical flexibility to meet exceptional circumstances. For fuel shortages the position is reversed.

- The small retailers have amicable relationships with their wholesalers and looked to them for supply chain continuity.

- The logistics service companies engaged in BCM on an ad hoc basis, depending on whether their clients were willing to pay for continuity planning as a 'nice-to-have' extra. Their critical assets are skilled employees. One of the largest Third Party Logistics suppliers (3PLs) was implementing a standardised approach to provide minimum cover for clients.

- The food processors and packagers are in a more precarious position. Their efforts centre around protection of key assets, because their operations are dependent on a few capital-intensive facilities. Some made no distinction between everyday operations, risk management and BCM. The manufacturers tend to rely on their ability to 'flex' production between sites as their main form of contingency. However, most conceded that the redundant capacity that provides the basis of this strategy is being steadily eroded by the pressure to reduce costs and optimise asset utilisation. Sites are being closed, consolidated and moved off-shore, at

which point the risk profiles for their UK operations change; the principal dependencies switch from manufacturing sites to transport, communications and the supporting infrastructure.

One of the main conclusions arising from this section of the report is that organisations are doing BCM out of enlightened commercial self-interest. Best practice BCM encourages them to take action to maintain the Mission Critical Activities and Assets of their organisations, under an expectation of otherwise normal external circumstances. They see the purpose of BCM being to protect the well-being of customers, employees and shareholders. It is not being undertaken for the 'public good' or to maintain operations in times of national emergency.

Actual Disruptions and Known Weaknesses

- Product contamination & recall: Food scares are what retailers and their branded suppliers most fear because contamination scares have destroyed brands in the past. Food scares/contamination are also events for which the industry is best prepared. Traceability systems are in place throughout the sector and are tested with drills and genuine recalls. However, some managers pointed out that whilst their systems had risen to the challenge of recent product recalls, the Food Standards Agency's own systems were not always able to do the same.

- Loss of access – terrorism: By virtue of their city centre locations, the retailers are far more susceptible to terrorist attacks than the other businesses involved in this study. Some have first hand experience of bombings.

- Loss of access – protesters: The transport providers, distributors and manufacturers felt that they were more likely to be affected by industrial action than terrorism, but were most concerned about events such as fuel protests or blockades. Site quarantines from industrial contamination or livestock diseases were also cited.

- Loss of site: Retail, factory and distribution sites are lost to fire and, less frequently, damaged by floods. Statistically these events were predictable but, as many managers pointed out, fewer and larger production and distribution sites meant that the impact of events of this kind was increasing.

- Reduced capacity: Reduced capacity across the industry means that it is becoming harder to make good capacity shortfalls when sites are compromised or lost. Some manufacturers are struggling to reconcile their own strategies for network consolidation with customers' requirements to demonstrate an ability to switch production to alternative sites as a BCM requirement.

- Loss of people: Disruptions from industrial action in the UK food and drink industry are rare. The shortage of skilled logistics staff was a more pressing concern for some of the companies. In some parts of the country

there was a growing dependency on migrant workers for both manufacturing and distribution.

- Loss of supplier: The small retailers relied totally on their wholesalers, but if they failed, the retailers would switch to another wholesaler/cash & carry. The larger organisations were all susceptible to disruptions from the failure of a key service supplier e.g. IT support, transport services or waste disposal. For manufacturers the failure of a packaging supplier is the most widely cited known weakness.

- Contractual cover: Contractual agreements were found to provide little cover in the event of a service failure, wider disruption or general shortage.

- Dual sourcing: Dual sourcing is the basis of many contingency plans, but widespread consolidation at every stage in the national (and global) networks of supply chains means that viable switching options for high-volume lines, particularly in the UK, were decreasing.

- Market forces: A combination of market forces – in the form of competitive pressures from retailers - and government policy on energy costs were cited as the main drivers behind the flight overseas of agriculture, ambient and frozen food production, and packaging manufacturing.

Preparation for Creeping Crises

The companies involved in this study made it very clear that they did not see preparation for extraordinary events as the purpose of BCM, although, in addition to widespread product contamination, there were some extreme scenarios that they had been asked to consider:

- Loss of fuel for road transport

- Loss of power, electricity or gas

- Loss of people through sickness/disease

Loss of fuel

The fuel protests were the most widely cited crisis referred to in this study.

- The retailers had weathered the crisis well. The larger ones had used their own forecourts to maintain supplies to stores, whilst the small independent retailers had continued to be supplied by their wholesalers. The crisis changed demand patterns at the small independents who experienced increased local trade, unless the store operated a forecourt, in which case food sales dropped.

- Problems with the government's priority user scheme for fuel were evident, with confusion over its administration within organisations, local government and at point of sale. There are real concerns surrounding

whether local authorities would have the resources or systems in place to respond quickly enough to issue priority user certificates, as and when they are required. A revision of the priority user scheme and its administration is recommended.

- There were fears over civil disorder and requests for police to be used to maintain order and administer the priority used scheme on the forecourts. There was also an expectation in some quarters that the Army would be deployed to prevent a reoccurrence of the 2000 fuel shortages. It should be noted that such an expectation could discourage organisations from holding buffer stocks of fuel or planning to overcome such an event in the future.

- There is evidence to suggest that the large supermarkets implemented their own priority user supply agreements during the fuel crisis, by making fuel available to suppliers of key product lines and service suppliers as well as their own vehicle fleets. Whilst this strategy maintains the supply of key lines to the supermarkets (thereby avoiding shortages of food and the associated panic/civil disorder) it could disadvantage those organisations that supply other customers in the catering and public service sectors. This potential conflict of interests should be recognised by emergency planners.

Loss of power

The loss of power scenario highlights the implications of organisations focusing on BCM to overcome 'single points of failure' *within their own businesses*.

- Offices and distribution centres were recognised by almost all the participating companies as single/significant points of failure. Head Offices all had Uninterruptible Power Supplies (UPS) for IT, whilst DCs had diesel-powered emergency generators to support some or all of their activities.

- There is no back-up power provision in the smaller retailer's stores, wholesalers' branches and in some of the largest superstores. The reliability of the UK electricity supply was judged to be such that a business case for investment in alternative supplies could not be justified.

- In stores, chilled and frozen stock would quickly deteriorate and, even if the stores stayed open, there would problems with pricing at tills, and with electronic point-of-sale (EPOS) replenishment systems. It is notable that there is no longer provision for paper-based credit card payments at tills. Without power the electric doors and loading bays at stores would be inoperable, consequently delivery schedules would be severely disrupted by multiple store closures. Security could also be an issue, as lighting and burglar alarms would be affected.

- In the event of a prolonged or widespread power outage, or significant rolling power cuts, the DCs would rapidly run out of storage space for 'undeliverable' returned loads, which would reduce throughput at DCs. Normal contingency measures for loss of DC operations (e.g. direct to

store delivery) would not work in this instance. Several days notice of managed power cuts would be required to allow an orderly rescheduling of deliveries to stores.

- At the manufacturing sites factories used electricity and/or gas. Some (but not all) of the companies had the capability to run independently of the National Grid. Some of those without backup power had taken the decision that the business case could not be made to justify maintaining generators. For others the power requirement was simply too great.

- Some of the manufacturing/importing companies that have invested very heavily in IT back-up do not make provision for paper-based trading. Across the manufacturing sector payment was not a short-term priority, but order processing was. For manufacturer to retail transactions the biggest difficulty if IT systems were inoperable would be insufficient manpower to manage the volume of transactions. Business-to-business ordering (between factory and ingredients suppliers) and factory planning was more feasible. However food traceability compliance would be compromised. The traceability issue was also emphasised by wholesalers and importers.

Loss of people/infectious disease

The H5N1 strain of Avian Influenza is recognised as being unlikely to pose a direct threat to human health in the UK, unless it jumps the species barrier and mutates into a form capable of human-to-human transmission. However H5N1 does have implications for the food industry:

- Some retailers and producers with business interests in the Far East have experience of H5N1 and have been monitoring its progress.

- Manufacturers are preparing to reformulate products with high poultry content. Some had changed stock holding policies in the light of related uncertainty over international supply and demand.

- Companies with poultry rearing interests have bio security measures in place. There were concerns that contact with poultry or even farms where poultry are present could be viewed as a high risk activity by employees, suppliers and trade unions.

- A number of companies had investigated the sourcing of facemasks and protective clothing, and had been surprised to see prices rising sharply during 2006.

Pandemic planning

By the time this study was completed all of the participating companies were conscious that a pandemic could mean labour shortages and high levels of absenteeism.

- Most companies felt that their workers should receive priority status for vaccinations/Tamiflu and protective equipment.

- In the event of a pandemic the large store operators were expecting a sharp rise in demand for home delivery services and the possibility of store closures.

- The superstore operators raised the issue of the role of in-store pharmacies as treatment centres, and the limited number of pharmacists as points of failure. This also underlines the multiple roles and potential conflicts of interests faced by large retailers in the event of a national emergency.

- The retailers again expressed fears of public disorder. There was the expectation that the police would be brought in to maintain in-store security. There is uncertainty within industry regarding the role of the Army in a civil emergency.

- The 3PLs and others with high staffing levels in distribution were concerned that absenteeism would soar. Some planned to overcome labour shortages during a pandemic through the use of (apparently immune) agency staff.

- Some manufacturers and importers were preparing detailed succession plans, and contemplating reducing product variety to conserve resources. Other are maintaining a watching brief with crisis management teams ready to swing into action at the start of a pandemic.

Competitive forces, stock cover and panic buying

Food distribution in the UK is as efficient as anywhere in the world, whilst its inbound supply chains are amongst the most international. The whole sector is driven by competitive pressures from the largest supermarkets. The implications of this are visible across the industry:

- One leading chain has set itself the goal of 10% stock reduction year on year as a proportion of sales. The rest of the industry strives for similar performance goals.

- Small independent retailers are responding to the big supermarkets' entry into the convenience sector by adopting the same JIT supply strategies, which is causing a shift away from reliance on ambient product sales to fresh and chilled lines. Small retailers have also reduced on-site storage space.

- Within the manufacturing sector the same structural changes are occurring. Stock holdings have given way to just-in-time deliveries of ingredients and packaging, whilst many manufacturers have dispensed with on-site storage for finished goods altogether. Any disruption to transport could quickly halt operations because of limited on-site storage.

- Distribution networks are consolidating to improve overall efficiency, with all the companies being encouraged to adopt the same approaches and solutions, often by the same external management consultants. The result is a clustering of strategic distribution centres at several locations within the 'Distribution Triangle' of central England.

- Politically sensitive product categories are often susceptible to panic buying. These categories tend to be either fresh produce with 'stockless supply chains', or ambient produce, mostly imported from overseas.

- For ambient products, the leanness of manufacturing operations causes problems during and in the aftermath of panic buying. Once drained of their stocks the supply chains take longer to recover because producers do not have the capacity to make up shortfalls quickly.

- Consumers panic buy. Retailers and wholesalers do the same. In a real emergency the retailers underlined the need for government to provide clear guidelines to the public and industry, to reduce hostility to store staff and the likelihood of public disorder.

The emergency response: priority lines and customers

It is recognised that in a real emergency companies will supply on a 'best endeavour' basis. However there are some measures which could be put in place ahead of such an event:

- Government should consult with retailers and wholesalers to identify priority lines (including non-food and pharmaceutical) which are likely to be moving through the same channels at the same time. Government should also provide one or more 'default lists', outlining essential items that should be prioritised in the immediate onset of an emergency.

- Decisions have to be made about priority customers. If suppliers prioritise lines and supply their biggest customers first, this would allow the largest number of consumers to be supplied in the most resource efficient way. On the other hand, there are some remote or socially deprived areas of the UK where penetration by the biggest retailers is low. To avoid disadvantaging these communities emergency food/non-food distribution should not be left to purely market forces.

- The notion that retailers might seek to 'profiteer' by raising prices during a shortage is debateable. Promotional pricing would be abandoned, but the likelihood is that retailers would look to suppliers to absorb price increases before passing price rises on to the consumer. However retailers would compete ruthlessly amongst themselves to secure available stock.

- Food and drinks suppliers did indicate that in an emergency they would consider cooperating with direct competitors to enable nationwide distribution of key food stuffs. The industry associations could broker such an agreement

Suspension of regulations

This study found that for industry to maintain supplies of food and drink in a national emergency, permission would have to be granted to waive certain regulations. In the event of a prolonged or widespread disruption to electricity suppliers and/or telecommunications, managers from all sectors recommended:

- Suspension of traceability requirements to allow companies to switch to basic operations using paper-based systems.

In the event of a life threatening pandemic or other similar national emergency, the suspension of the following may be necessary:

- Legal liability and everyday duty of care legislation to enable volunteer staffing at retail and distribution sites.

- The drivers' working hours directive.

- Benefit rules to allow part-time shop staff to work longer than usual hours without being penalised by loss of benefit entitlement.

- Permission for manufacturers to produce a nutritionally safe and functional product that may vary in formulation from that specified on the label

- Anti-trust regulations that inhibit competitors from collaborating

This report provides a number of more specific options for improvement that would enable companies to improve BCM and the resilience of the Nation's food and drink supplies. Significant investment in redundant capacity and capability are the options most likely to improve resilience in the shorter term, but they are unlikely to be taken up in the current business climate. The reality is that only one company involved in this study was investing in contingent capacity, and then only after the business had been damaged by being too lean. In the longer term, increased redundancy at company level would likely undermine short term efficiency and encourage further industry consolidation and off-shoring. The fundamental problem is that it is the very efficiency of the nation's food and drink supply chains, under normal circumstances, that make them so vulnerable under abnormal ones. Attitudes and circumstances toward supply chain vulnerability have changed dramatically in the last 5 years. They may change further as circumstances change, but for the moment it is unrealistic to assume that BCM would ensure the continuity of food and drinks supplies in the event of a national emergency. Planning for a range of 'effects based' scenarios will certainly help, but there must be proactive planning by government as well as industry. This report aims to facilitate that process.

Introduction

Responsibility for emergency management in the United Kingdom falls first and foremost to local authorities and emergency services. Central Government only becomes involved if the crisis is so widespread that national coordination is required. In a situation of this magnitude a Central Government department is nominated as the Lead Government Department (LDG). In the event of a crisis affecting the nation's food or drink supply the Department for Environment, Food and Rural Affairs (Defra) has been designated the leading role.

This report outlines the findings of a 13 month study undertaken by the Resilience Centre, Cranfield University and funded by Defra. The purpose of this research is to contribute towards 'evidence-based' policy making in relation to Defra's responsibilities as LGD for food and drink supply, under the Cabinet Office Capabilities Programme (Cabinet Office 2006). Under the programme the LGD is obliged to establish agreed response plans with their sectors and partners, which will include the maintenance of business continuity. The extent of those responsibilities is outlined on the Programme's web page and in more detail in the Cabinet Office publication *"The Lead Government Department and its role – Guidance and Best Practice"* (Cabinet Office 2004).

Funded by Defra's Industry and Emergency Divisions, this is the first qualitative study undertaken for this purpose in the UK. The research aims to examine the actual scope, extent, objectives, motivations and limitations of existing Business Continuity Management (BCM) policies and practices within the food and drink industry. The objective is to assess the likely effectiveness of industry's continuity planning and consequence management practices in the event of a potentially significant disruption. In doing so the study also aims to contribute to the wider resilience debate, as well as providing useful pointers for companies, which may assist them with the implementation of their own BCM programmes.

The food and drink 'industry' includes food and drink producers, manufacturers, wholesalers, distributors, retailers, and caterers. For the purpose of this study a 'significant' disruption is taken to mean *'a disruption of supply of food and drink to consumers which may result in choice of food being seriously impaired'*. The underlying priority is the implication for human wellbeing. The economic/commercial damage resulting from such a disruption is not the primary concern of this study, although its importance to commercial organisations and the economy is recognised.

Terms of reference

The specific terms of reference for this study are:

- To undertake a selective review of relevant literature and related research programmes.

- To assess the extent and quality of business continuity planning/management in the food and drinks industry for a limited number of 'key' product categories.

- To identify causes of actual disruptions experienced, near misses and known weaknesses in the supply chains studied.

- To highlight (without identifying individual companies) potential or actual shortcomings in business continuity planning/management within the sectors or categories studied.

- To identify generic options for improvement, which could be used to minimise unacceptable levels of risk that have been identified as likely to cause significant disruption to the food and drinks industry.

- A systems-based approach will be used to identify linkages between threats to the food and drink supply and to identify monopoly suppliers [single points of failure].

The approach

In keeping with the terms of reference for this study, the research draws on the long-standing advice of systems theorists working in social policy (e.g. Rittel and Webber 1973) and more recently in risk management (White 1995) by adopting a holistic, interdisciplinary perspective. The process of enquiry itself adopts a systematic approach, as proposed by Checkland (1994), to this complex, ill-delineated problem.

A total of 28 organisations, representing multiple tiers of food and drink supply chains, participated in this study. They were:

- 2 Large grocery retailers – i.e. supermarket chains
- 2 Large grocery wholesalers/distributors
- 3 Small independent retailers
- 9 Suppliers of 'Key Foodstuffs'
- 6 Suppliers of ingredients/condiments/joint ventures suppliers
- 2 Packaging suppliers
- 2 Transport providers
- 2 Industry associations (retail and distribution)

With the exception of the small independent retailers and industry associations, participating companies were mostly selected according to size of UK market share, usually (but not always) involving the largest in each category. The 'Key Foodstuffs' include four potentially politically sensitive categories and four broader categories based on processing technology/handling requirements. Although the companies were selected to represent the eight categories, several organisations were active in other categories too, including animal feed and pet food. The Key categories were:

- Bread
- Milk
- Water (bottled)
- Infant formula

- Frozen foods
- Tinned food
- Chilled foods (including meat)
- Other ambient: e.g. beverages or bulk carbohydrate

Each of the participating companies was asked to nominate two or three managers for this study, preferably individuals with responsibilities covering some or all of the following areas:

- Supply chain management (e.g. purchasing/supplier management and/or transport & distribution)
- Business continuity
- Risk management
- Other relevant disciplines (e.g. quality)

A total of 61 managers were interviewed (see Appendix A for further details). In addition, input was received from the largest North American retailer. The results were collated using a bottom-up approach i.e. first by individual interviewee, then by organisation, and finally cross-supply chain and industry. The findings are grouped and presented by theme, and supported by a selection of abstracted quotations. The purpose of this is, where possible, to allow the managers' own voices to be heard. To protect the anonymity of individuals and the organisations concerned, no manager refers to his or her own company by name. Inevitably, some make reference to other companies. In most instances such references to the names of third parties or to other organisations' brands have been left in place.

The interview questions reflected the terms of reference for this study. In addition questions were included relating to three 'effects-based' scenarios:

- Loss of power
- Loss of fuel for road transport
- Loss of people

The three scenarios highlight common elements, which could conceivably affect all organisations involved in this study. Loss of power (for whatever reason) was included because widespread power outages were experienced in the UK in the 1970s, due to industrial action. More recently the US, parts of Europe and Dubai have all experienced widespread infrastructure failures resulting in the loss of electricity (Carrington and Hecht, 2003; Göhl 2003). Furthermore, it is widely recognized that in the event of a severe winter the UK may have insufficient gas storage or generating capacity to meet demand for electricity (Taylor 2003). Overseas energy suppliers may be unwilling or unable to meet any shortfall (Laughton and Watkiss 2002).

Loss of fuel for transport reflects the UK's dependence on road transport, highlighted by the fuel protests of 2000 (Lyons and Chatterjee 2002) and, subsequently, by desk-based research into the likely effects if heavy goods vehicles were removed from the UK's roads for one week (McKinnon 2004).

The third scenario deals with loss of people, possibly reflecting the outbreak of some serious contagious disease such as SARS or a global flu pandemic. The spread of the H5N1 strain of Avian Influenza and fears that it might mutate to trigger the next human flu pandemic has made this question an emergency planning priority (House of Lords 2005). The decision to include this question within the scope of this study was taken in May 2005, at a time when the pandemic threat was receiving little attention in the media. It has since risen up the list of political and corporate priorities. In May 2006 the *Harvard Business Review* took the unusual step of including a 13 article Special Report on *Preparing for the Pandemic* covering everything from business continuity management to medical facts and employers' legal liabilities.

Limitations

It is acknowledged that food and drink supply chains are increasingly international. Nevertheless, the primary focus of this study is on disruptions to the supply of food and drink in England. It is also acknowledged that a disruption to supply in one sector of the industry will likely result in displacement of demand to others. However, limitations of time and resource mean that this initial study will focus on retail supply chains only. It is anticipated that catering will be included in the programme of research at a later date.

The majority of organisations that participated in this study were large industry leaders, often multi-nationals, it would therefore be inappropriate to suggest that the findings of this report are representative of the 'average' English food company. Such generalisations could only be made from a study of a much wider and more diverse population. Finally, this report is exploratory and consultative in nature and

whilst the terms of reference require 'options for improvement', they purposefully stop short of the inclusion of explicit recommendations.

Structure of this report

The report is structured into six main sections:

- Section 1 presents the literature review and a selective summary of recent research.
- Section 2 examines business continuity management in the participating organisations and their supply chains.
- Section 3 looks at actual disruptions experienced by the companies, near misses and known weaknesses within their supply chains.
- Section 4 deals with widespread systemic supply chain failures, including preparedness for loss of fuel, energy and pandemic planning.
- Section 5 looks at the impact of competitive pressures on stock cover, at panic buying, and prioritisation of supply.
- Section 6 provides a summary, conclusions and options for improvement.

Some observations on participation

This study is the first extensive qualitative study of its kind involving a cross section of the key players involved in the supply of food and drink in England (and beyond). At its inception there were fears that industry would be unwilling to volunteer information about the potentially commercially sensitive issues covered by this study. Experience has proved these fears were unfounded. Some of the country's largest retailers and wholesalers readily put forward their own internal experts to contribute to this study. Their first tier food and transport suppliers (mostly UK subsidiaries of large trans-national companies) have been equally willing to devote senior management time to this research. Most were pleased (or even relieved) to learn that government is taking an interest in these matters. They viewed participation as an opportunity to learn and voice their concerns, as well as demonstrate their willingness to be good corporate citizens. As individuals, many welcomed the chance to 'do their bit' for the country. Only one large branded multinational company declined to be involved in the study, on the grounds that it considered its own competence in this area as a source of competitive advantage. Other smaller organisations (chilled food companies involved in the preparation of ready meals) have declined due to lack of resources and shortage of management time. It is recognised that this may or may not also be an indication that the smaller and medium-sized companies lack the resources to pursue business continuity within their own organisations.

Without exception, all the organisations who participated claimed to have learned something from the experience. The research aimed to provide a 'snap shot' of current practice within industry, but the very act of asking the questions prompted many of the interviewees to investigate issues and reveal weakness that had hitherto

gone undetected. Several admitted to having met with other colleagues to compare notes first. While this arguably undermines the independence of their replies, the managers concerned had often never before discussed these matters with operational staff or colleagues from other parts of their businesses, this appeared to be one of the major benefits of participation.

Section 1. Selective Review of Literature and Current Research

1.1 Introduction

This selective review focuses on practitioner-oriented research or other key works outlining best practice in emergency planning; business continuity management; supply chain vulnerability, security and resilience. Most contain their own lists of references and/or extensive bibliographies. The purpose of this review is to critically evaluate these core texts in light of the objectives of this research and underlying civil contingencies agenda. The review builds as appropriate on these core works, by drawing on press reports, practitioner texts and academic journal articles. In addition, it outlines of a number of other relevant research programmes, recently completed or currently underway in other institutions around the world are provided.

1.1.1 Civil contingencies in England

Civil contingency planning is defined as *"the application of knowledge, measures and practices to anticipate, guard against, prevent, reduce or overcome any hazard, harm or loss that may be associated with natural, technological or man-made crises and disasters in peacetime"* (Cabinet Office 2003, p.1). In England, planning for such eventualities falls under the remit of Local Government Authorities. In 2000 the Home Office initiated a Local Government Review of Emergency Planning. However, in June 2001 a new national agency, the Civil Contingencies Secretariat (CCS), was established within the Cabinet Office to coordinate strategy and policy at national level. CCS was formally charged with improving the country's resilience to all forms of disruptive challenges.

Born directly out of the chaos of the Fuel Protests in 2000 and recognition of shortcomings in the handling of Foot & Mouth Disease, the CCS has overseen the most comprehensive review of national emergency planning doctrine since World War II. The review was deemed necessary because disruptive events of this kind were so different in character from the 'sudden onset' emergencies – bombing, accidents or natural disasters - that local authority emergency planners had hitherto focused upon. Analysis of the handling of the 2001 Foot & Mouth outbreak by Government (Cabinet Office 2001) and academic observers (e.g. Harvey 2001; Lowe, Edwards and Ward 2001) concluded that at least part of the problem was that official perceptions were out of touch with the changing realities of farming and its place within regional rural economies across the UK. Lowe, Edwards and Ward (2001) summed this up by noting that *"a crisis such as this challenges fundamental assumptions by revealing underlying realities. What this crisis has revealed above all is how much the countryside has changed in recent years and how out-of-date are official and public conceptions" (p.16)*

The terrorist attacks of 9/11 quickly drew public attention back onto more widely recognised aspects of emergency planning and disaster management. Nevertheless, when the newly revised 3rd edition of the emergency planning doctrine, *Dealing with Disasters,* emerged in 2003 it focused on contingency planning for all 'major emergencies' (Cabinet Office 2003). Major emergencies is a generic term to cover

'disruptive challenges', 'disasters', 'crises' and 'major incidents' whether sudden crisis or disasters (e.g. transport disasters, riots or explosions) or slow on-set 'creeping crises' (e.g. Bovine Spongiform Encephalopathy ((BSE)), Fuel Protests and Foot & Mouth). Both types of emergencies, and indeed hybrids of the two – e.g. where food and drink supplies are disrupted as a consequence of a 'sudden onset' emergency – were recognised. The disaster that would befall New Orleans in the aftermath of Hurricane Katrina falls into this hybrid category.

1.1.2 The revised doctrine

Dealing with Disasters (Cabinet Office 2003) provides guidance on basic principles and best practice derived from recent experience of dealing with peacetime emergencies in the UK. More specifically, the document provides *"a generic framework for civil protection within which the detailed civil contingency plans of the emergency services, local authorities, government departments and other statutory, commercial and voluntary organisations at local, regional and national level can be prepared"(p.1).* It is not intended to be prescriptive or to be used as an operational manual. Nor is it intended to encourage micro-level planning for all possible threats, although it is recognised that some detailed plans already exist for dealing with known, location specific chemical and nuclear hazards. Although large scale natural disasters (e.g. hurricanes or earthquakes) are rare in the UK, it is also acknowledged that density of population could bring its own problems, should such an event occur.

In terms of actually dealing with disasters if and when they occur, the revised doctrine advocates an 'Integrated Emergency Management' (IEM) approach, which involves management at all of several levels: assessment, prevention, preparation, response and recovery management by organisations. It is noted that the IEM approach differs in two ways from earlier approaches to disaster management in England and elsewhere in the UK: First, it places greater emphasis on prevention and preparation – through better identification and assessment – than has traditionally been the case. Second, it demonstrates greater awareness of the need to manage 'creeping crises', where, it acknowledges, specific scenarios are less easy to identify. Throughout, *Dealing with Disasters* underlines the need for integrated planning within and between organisations; it also promotes development of cohesive generic responses and recovery plans to *"deal effectively with common consequences of events (rather than the prime focus of being on the different causes)'... regardless of whether the emergency arises from natural causes, human error, technical failure or through malicious act" (p.6).*

Though recognising the different characteristics of sudden onset and creeping crises, *Dealing with Disasters* itself tends to default back to the assumptions of sudden onset emergencies and the public service mandate when discussing the role of the private sector. For example, it suggests that private sector organisations may play a major part in responding to disasters, citing utilities or private sector organisations. However, it does so in the sense that private sector companies may be hosting (site specific) disasters e.g. at public venues, ports or airports. Elsewhere, it mentions that they may give support through the provision of equipment, knowledge or specialist services, but then moves on to focus on the issue of avoiding bankruptcy after a major event and urges them to prepare survival plans.

What is perhaps most pertinent to this study is that *Dealing with Disasters* makes it clear that although methodologies to deal with sudden onset emergencies are relatively well developed, the same cannot be said for creeping crises. It is recognised that they display quite different characteristics to sudden onset emergencies.

Creeping crises are so called because they tend to build slowly at first (often almost unnoticed at a national level), then escalate quickly, causing enormous economic damage and social disquiet. Unlike bombings or accidents the events tend not to be site-specific. Recent experience suggests they may have many sites or none at all. Moreover, it has been industry and government, not the 'Blue Light' emergency services, who have found themselves in the unfamiliar role of 'first responders'. Though not overtly recognised in the doctrine, the creeping crises are remarkable in one other respect – they represented *systemic supply chain disruptions*.

1.1.3 The Civil Contingencies Act 2004

The Civil Contingencies Act provides the underlying context for this study. It defines an emergency as *'an event or situation which threatens serious damage to: (a) human welfare; (b) the environment in the United Kingdom; or (c) war, or terrorism, which threatens serious damage to the security of the United Kingdom. Damage to human welfare includes (a) loss of life; (b) human illness or injury; (c) homelessness; (d) damage to property; (e) disruption to a supply of money, food, water, energy or fuel; (f) disruption to a system of communication; (g) disruption to facilities for transport; and (h) disruption to services relating to transport'*.

Although responsibility for emergency management rests first and foremost with Local Government Authorities, it is acknowledged that some emergencies may be national rather than localised. In these cases certain Central Government departments have been appointed as 'Lead Government Department' (LGD) to assume a coordinating role in crisis management and policy making. For example, in the event of a major fuel shortage, the Department for Trade and Industry (DTi) would lead. An emergency involving the supply of food or water – or indeed its prevention – would fall primarily within the remit of Defra.

Reflecting the requirement for better identification and assessment, the Civil Contingencies Act (2004) places new responsibilities on Local Government Authorities and other life and death public services, plus those commercial organisations with responsibility for essential public transport and critical national infrastructure. All are legally obliged to undertake Business Continuity Planning and risk management assessments. The Act also requires Local Authorities to improve their preparedness through the identification of 'critical supply chain dependencies'. A survey of Local Authorities by Marsh Consulting, timed to coincide with the introduction of the Act revealed that the majority of Local Government Authorities were unprepared for their new responsibilities and that progress on identification of supply chain dependencies was poor (Marsh 2004).

It is important to note that the Civil Contingencies Act does not apply directly to any of the organisations participating in this study, although in the event of an emergency some of the private sector organisations involved may share much in common with suppliers to the public sector organisations bound by the Act.

1.1.4 Supply chains

For most ordinary people 'supply chains' are a means to an end, they are the mechanisms by which the goods and services we use are delivered to us all. The term 'supply chain' lingers on, even though there is near universal recognition that supply chains are more than just linear sequences of processes or activities. They are complex systems of interacting networks. Figure 1 illustrates the notion of a supply chain as a multi-level complex system, comprising flows of materials, goods and information (including money), which pass within and between organisations, linked by a range of tangible and intangible facilitators, including relationships, processes, activities, and integrated (information) systems. In practice they are also linked by physical transport and distribution networks and by national/international communications and transport infrastructures, although these important elements have tended to receive less attention from writers and researchers working in Supply Chain Management.

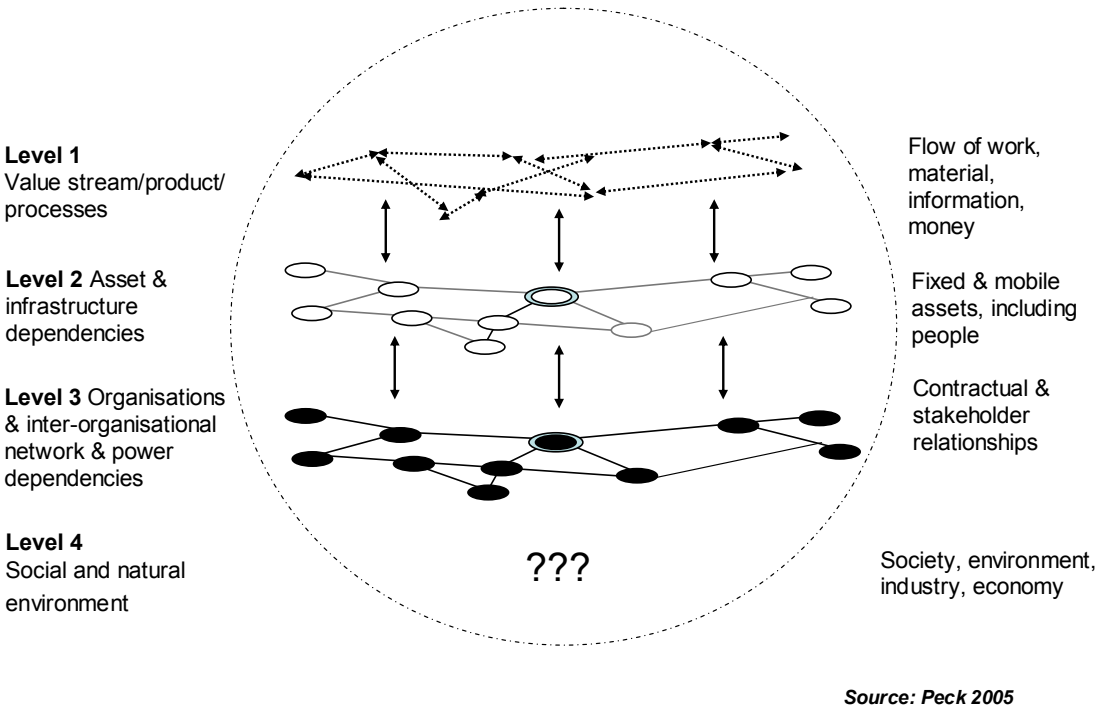

Figure 1. A supply chain as a dependent interactive system.

1.1.5 Supply chain management

As a management discipline Supply Chain Management (SCM) represents an amalgamation and re-labelling of established business activities, including manufacturing-based 'operations management' (elements of purchasing, order and inventory management, production planning and control as well as customer service) and 'logistics' (integrated transport, warehousing and distribution). At one time all of

these activities might have been performed in-house, within a single large vertically integrated manufacturing company, such as the Ford Motor company in the early part of the 20th Century. Vertically integrated corporations – where the same company owns every stage of the production and distribution process – are increasingly rare in the Anglo-Saxon business environment. Over the last twenty years or so, best practice in strategic management thinking has urged corporations to focus energy and investment only in those areas where they have a winning 'core competence'. In this fiercely competitive environment the logic is that effort is directed to those activities that add most value to (and produce the greatest profit from) the delivered final product or service. Corporations have been encouraged to divest the remaining activities and buy in products and services from other specialists in the increasingly global market place. Whilst this might enable goods and services to be purchased at less cost than might have been the case in a vertically integrated enterprise, it can make supply less certain, and manufacturing and service delivery more difficult to coordinate. This can, in turn, reduce the efficiency of the whole process, particularly for complex high value products like cars, weapon systems or buildings, where the inventory carrying costs for work-in-progress, finished or obsolete goods can be extremely high. SCM aims to overcome these inherent difficulties by improving inter-organisational co-ordination, thereby easing the flow of goods and information within and between organisations from the production of raw materials through to the final consumer.

Though SCM is a relatively new discipline, many of its fundamental assumptions such as the sharing of information and systems integration across organisational boundaries, (to allow the substitution of information for costly inventory) have been around for decades. Back in 1958 Professor Jay Forrester predicted, "there will come a general recognition of the advantage enjoyed by the pioneering management who have been the first to improve their understanding of the interrelationships between separate company functions and between the company and its markets, its industry and the national economy". SCM theory has embraced much of Forrester's work on systems dynamics, particularly in terms of understanding and improving stock flows and responsiveness to consumer behaviour, though the link to the increasingly global macro-economy has received relatively little attention.

In practice, operational SCM continues to reflect managerial functional legacies and the term 'supply chain' continues to mean different things to different people. However, academics working in the SCM field have endeavoured to present supply chains in a way that reflects this integrative ideal. One of the most widely cited academic definitions comes from Christopher (2005) who defined supply chains as, "the network of organisations that are involved, through upstream and downstream relationships, in the different processes and activities that produce value in the form of products and services in the hands of the ultimate customer" (Christopher 2005). Christopher's network-based definition of a supply chain reflects a near universally accepted position within the SCM discipline throughout the Anglo-Saxon business world i.e. that supply chains are a means to a specific end – customer value creation *within the context of a competitive business model*. For example, Mentzer *et al* (2001) state that the ultimate goals of SCM are "lower costs, increased customer value and satisfaction, and ultimately competitive advantage". The US-based Council of Supply Chain Management Professionals (CSCMP) states that SCM's purpose is as

an integrative function that links other business functions and processes to create "a cohesive and high-performing business model" (CSCMP 2005).

However, this study takes a slightly different line, one that is perhaps closer to the layman's concerns and Forrester's broader vision. Here supply chains are presented as more than aggregations of commercial enterprises and their value-adding activities. They are complex networks that link organisations, industries, and economies. They are part of the fabric of our societies. The resilience of supply chains is therefore critical for individual organisations, the economy, and the wellbeing of society as a whole.

1.1.6 Transport disruptions

Much of the emphasis of SCM today is on aspects of purchasing, supplier management and the technological solutions that facilitate more efficient inventory management; the ultimate aim of the technological solutions being the substitution of information for physical inventory. Yet the physical distribution of products remains an essential, if unfashionable, aspect of effective SCM. Transportation failures are therefore a significant source of supply chain vulnerability. They can be classified into three broad groups: damage, loss and delay. All can have a significant impact on service levels, with the first two also causing discrepancies in demand, stock level and availability data. Whilst insurance might off-set the immediate cost of the first two, in an age of just-in-time (JIT) inventory management, delay is more often the greater concern.

JIT supply chain concepts are implicitly predicated on a reliable transport and communications infrastructure. Yet companies are not always quick to recognise that global sourcing and supply increases the transport and national infrastructures components in the overall mix. Terrorism, inclement weather and other natural hazards aside, national and international transport systems have been showing signs of stress for some time (e.g. Johnson 2001). In the UK, while haulage companies are all too familiar with the problems of driver shortages and road congestion, their customers appear to be less attuned. Research by Fowkes *et al* (2004) showed that shippers (i.e. manufacturers) using third party services placed a much lower value on journey time reliability than those using in-house services even in JIT supply chains. The authors concluded that this may be because the manufacturer did not consider the often considerable cost to the haulage contractor of the increased journey times. Although there have been relatively few general surveys on transport delays, successive surveys undertaken by Heriot Watt University asked companies involved in the UK food supply chain to monitor deviations from schedule that caused 'inconvenience'. The findings of a 1998 study indicated that approximately one quarter of all journey legs were subject to significant delays (DETR 1998). Relative to total lead-time (elapsed time between order placement and its arrival at the customer's premises) or total supply chain cycle time (including production processes) these delays are typically short. A further study in 2002 drew similar conclusions, showing that 29% of journey legs experienced delays, though its author notes that difference in survey profiles (journey length and the proportion of multiple drops/collection rounds) make direct comparisons between this findings and the earlier study unreliable.

Elsewhere, supply chain 'pipeline' mapping has revealed that total transit time is likely to represent only a tiny proportion of lead-time or cycle time (Hines and Taylor 2000). However, the significance of transportation delays should not be judged only by the ratio to total lead-time. At critical points in the supply chain the late arrival of a consignment, even by the smallest of margins, can cause costly disruptions to operations. On regular journeys companies tend to adjust schedules by building in sufficient time buffers to accommodate the more usual hazards such as bad weather, traffic congestion, accidents etc. Major disruptions are another matter. A study by McKinnon (2004) is discussed later in this literature review, and provides insight into the wider implications if the UK were to experience *'Life without Lorries'* for one week.

1.1.7 Business continuity management

In the UK, it is understood that Business Continuity Planning (BCP) came to the fore in many organisations as efforts got underway to deal with the turn of the century and the problem of Y2K compliance. Y2K made everyone aware of how IT dependent our societies had become. Industry followed government advice and invested in BCP. In the event Y2K passed with barely a hitch, but its legacy was mixed. It left many managers sceptical about the need to spend scarce time and resources warding off supply chain disruptions that might never occur. In government the event was viewed differently. BCP had successfully averted an economic melt-down and the Y2K model was hailed as a template for dealing with other potentially disruptive events.

Today the preparation of Business Continuity Plans is seen as just part of the wider, rapidly evolving Business Continuity Management (BCM) discipline. Its underlying concepts were laid down in the mid 1980s (Barnes 2001). As a discipline, BCM's roots are unquestionably in IT disaster recovery, but its proponents within industry were quick to embrace a wider mandate. The terrorist attacks of 9/11 provided new avenues for the business continuity industry and all aspects of security management. As Barnes (2001) observed, by 2001 the BCM remit had expanded from protecting 'mission critical computer data' to encompass the protection of all 'mission critical corporate assets'. These 'assets' include: data and information; high-value physical items; people and their experience; knowledge; commercial contracts; and, ultimately, corporate reputation.

By 2003 BCM had realigned once more, this time around 'mission critical activities'. This shift has allowed BCM to become more readily aligned with wider corporate risk management and corporate governance agendas, as reflected in the British Standards Institute (BSI) 'Publicly Available Specification 56' (PAS 56), a draft version of a full British Standard for BCM[1]. According to PAS 56 BCM is a: *"holistic management process that identifies potential impacts that threaten an organization and provides a framework for building resilience and the capability for an effective response that safeguards the interests of key stakeholders, reputation, brand and value-creating activities"*. It goes on to state that BCM is *"directly linked to corporate governance",* presenting BCM as a unifying process covering a broad spectrum of disciplines

[1] The full British Standard was due in May 2006, but has yet to be introduced as this report was prepared.

including: risk management; disaster recovery; facilities management, supply chain management; quality management, health and safety; knowledge management; emergency management; security; crisis communications and PR. For the most part it presents BCM as a set of principles, policies and tools, which would enable an organisation to maintain its core operations. However, the underlying assumptions remain internally focussed, implicitly encouraging organisations to proceed on the assumption that most disruptions would be encountered under more or less 'normal' external conditions: *"Whilst bombs, fires and floods capture the headlines, most crises are 'quiet catastrophes' that only affect an individual organization. These quiet catastrophes have the potential to damage an organization's most valuable assets i.e. its brand or public image and its reputation."(p.iv).*

Supply chains are certainly mentioned within PAS 56. Indeed their importance is recognised in the introduction, but the remaining 29 pages fail to provide the uninitiated with a definition of supply chain(s), or any further explicit guidance on their scope or nature, their management, or relationships to risk and business continuity. However, strategic outsourcing appears to be the primary SCM theme. A definition of the 'Just-in-Time' delivery concept is provided within the glossary of terms: *"Just-in-time supply chain (JIT): system whereby dependencies for MCAs [mission critical activities] are provided when required, without requiring storage" (p.2)*. JIT is however only one concept within the wider SCM lexicon.

1.1.8 The corporate governance agenda

Corporate risk management has been in the ascendancy for some time, largely due to increased corporate governance requirements imposed by financial market regulators (e.g. Turnbull Report 1999) or international accords, such as the Second Basel Accord (Basel Committee on Banking Supervision, 2004). The latter, which has taken several years to introduce, aims to improve the resilience of the international banking sector to 'operational risk'. Its inception followed the collapse of Barings Bank and a number of similar debacles in the late 1990s. The outcome of the Barings episode not only destroyed the bank, but threatened to undermine confidence in the financial markets as a whole. The Basel Accord therefore aims to improve the resilience of international banking by reducing 'operational risk' within each organisation, through greater transparency in decision making and through tighter internal controls on management process.

The logic behind the corporate governance regulations are clear, however, they and much of the legal system remain wedded to outdated 'classical' concepts of firms. They have continued to reflect the view of a company as a stand-alone production entity with readily identifiable legal boundaries and operational responsibilities. Corporate governance and associated approaches to corporate risk management have therefore largely failed to keep pace with the reality of strategic outsourcing, network-based concepts of the firm, and indeed the supply chain. The result is that corporate governance requirements may still encourage organisations to simply shift financial liability for operational/supply chain failures off balance sheet to weaker parties in the supply chain (usually suppliers). Whilst this approach enables managers within the stronger companies to comply with regulatory requirements, the transfer of liability for the management of operational risk does not protect the company concerned from the operational consequences of such failures.

Latterly, some common risk transfer or supply chain 'risk sharing' practices have come under closer scrutiny by regulators, most notably in the US with the introduction of the Sarbanes-Oxley Act, 2002. The collapse of the mighty Enron and WorldCom Corporations in 2002 again reignited fears that organisations with poor internal controls could threaten the future of financial markets. The Sarbanes-Oxley Act, affecting all US stock exchange listed companies (and their suppliers) sought to prevent similar occurrences in the future (Marshall 2003). In common with other corporate governance reforms passed elsewhere, Sarbanes-Oxley makes top management directly accountable for establishing effective internal process controls and documenting procedures for (amongst other things)'event management', 'risk assessment and risk response'. However, sections 401 and 404 of the Act formally extended the scope of the US regulation beyond the legal boundaries of a single firm into the wider realms of its supply chain (Craig 2004). Section 401 demands that organisations declare all 'material off balance sheet transactions' including 'contingent obligations' and 'interests transferred to an unconsolidated entity'. These clauses encompass some inter-organisational risk sharing and risk transfer activities. For example, fixed volume shipping service contracts are guarantee contracts. Additionally, vendor managed inventory (VMI) and outsourcing agreements – sometimes used to hedge risk and place retained assets off balance sheet - must also be declared. Moreover, Sarbanes-Oxley demands that providers of outsourced services (including logistics service suppliers) must be able to demonstrate the existence of appropriate internal process controls. Finally, it demands that consideration be given to other possible externally induced disruptions. Externally induced disruptions include disruptions to transport and communications systems.

1.2 Recent Research in the UK

1.2.1 Supply chain vulnerability, risk and resilience

Creeping crises (i.e. Fuel Protests and Foot and Mouth Disease) provided the initial impetus for Cranfield University's programme of Department for Transport (DfT) government funded research into issues of supply chain vulnerability and resilience.

The first phases of the Cranfield programme were commissioned by the DfT's predecessor (Department for Transport, Local Government and Regions), with support from the Home Office and the Department for Trade and Industry. They began with a limited literature review and a small scoping study to investigate the issues surrounding *'Supply Chain Vulnerability'* (Christopher *et at* 2001). The research programme moved into its second phase, *'Supply Chain Resilience'*, in May 2002. Throughout the latter study the term resilience was used in accordance with its common English usage to mean the "ability of the system to return to is original [or desired] state after being disturbed" (Collins English Dictionary 2000). *The Supply Chain Resilience* project involved a survey of current practice in BCM, undertaken in conjunction with the Business Continuity Institute and Chartered Institute of Management (Chartered Institute of Management 2002; Peck and Juttner 2002). Whilst the core of *Supply Chain Resilience* was a more in-depth look at supply chain vulnerability in military aircraft manufacturing (Haywood 2002; Haywood and Peck 2003), with comparisons made across a number of key sectors of industry, including healthcare, electronics, oil/petrochemicals, automotive spares, transport, food and packaging (Peck *et al* 2003). Within this body of work, a multi-level systems-based

approach was developed to provide a simple framework to assist managers in the task of understanding the sources and drivers of supply chain vulnerability (Peck 2005).

Supply Chain Resilience also provided a generic operational supply chain management tool-kit (based on well-established Total Quality Management and process control methods) and a workbook for supply chain managers (Cranfield 2003). Accompanying publications (e.g. Christopher and Rutherford 2004) advocated Six-sigma style process control methodologies to reduce process uncertainty in supply chain operations.

More recently, a report entitled *'Opening the Way to Successful Risk Management in Purchasing and Supply'* was produced by the Resilience Centre at Cranfield University (Peck 2006). It reports on a survey undertaken in conjunction with the Chartered Institute of Purchasing and Supply, into risk management in purchasing and supply. In some ways the findings of this study echo those of a BCI 2005 survey. The Cranfield/CIPS study also found that customer requirements had become the primary driver of risk management in purchasing and supply, with changes in business strategy and corporate governance concerns close behind. However, the Cranfield/CIPS survey revealed distinct differences in attitudes and approaches to risk management between sectors. For manufacturing business, experience of a recent supply chain disruption was by far the strongest driver. For retail, distribution and transport companies, corporate social responsibility led the way. In finance and business services, changes in strategy had pushed risk management to the fore. The same applied to national and local government and other public sector organisations. Similar sector differences were visible when it came to approaches to risk identification and risk management. Further research is needed to ascertain whether these differences reflect a failure to adopt 'best practice' risk management in purchasing and supply, or whether the findings reflect inherent differences in the risk profiles of the organisations concerned. It could be that a 'one size fits all' mentality is simply not appropriate.

This study *Resilience in the Food Chain* formally aligns the Cranfield research programme with the UK Civil Contingencies agenda and the on-going development of national emergency planning policy and practice. It builds on the earlier Cranfield studies into supply chain risk, vulnerability and resilience, and studies of the impact of transport disruptions, particularly work undertaken at Heriot Watt University (McKinnon 1998; 2004).

1.2.2 'Life without Lorries'

Life without Lorries was a hypothetical desk-based study undertaken at Heriot Watt into the effects of transport disruptions in the UK (McKinnon 2004). It drew on data from up-to-date published sources (e.g. *Retail Logistics*[2]), to indicate what might happen if no lorries operated on Britain's roads for one week.

Retail distribution in the UK is overwhelmingly dependent on road transport and in the event of such a severe disruption to road transport McKinnon (2004) suggests that

[2] *Retail Logistics* is an annual compendium of statistics compiled and published by the Institute of Grocery Distribution. It is widely regarded as the definitive sourcebook for fact and figures on all aspects of retail logistics in the UK.

grocery retailing would be most affected, followed by catering, fuel supply, healthcare, banking, post & parcel services, brewing and waste disposal. Grocery distribution would be most readily affected because of the high volume through put, low inventory levels and highly time-sensitive deliveries. Bread, fresh produce, chilled products and fresh meat would (even at normal consumption rates) be depleted within hours. Fast-moving ambient products are replenished at approximately the same rate (1.5 times per day; 11.6 per week). Distribution centres hold higher stocks of ambient products (no stocks of fresh), but these could not be moved to point of sale.

In such an eventuality McKinnon suggests that it would be possible to substitute fresh produce for long life (canned/dried/frozen) foods and that some raw food stuffs could be processed differently e.g. more milk used for cheese instead of sold fresh. The author also investigates the practicality of shifting from national to local sourcing. He notes that each tonne of freight moves an average of 92 km by road, up from 35km in the 1950s. Local sourcing would, however, lead to a drastic reduction in consumer choice, as the average UK supermarket now stocks 22,000 lines, up from 250 lines in the 1950s. The shift to local sourcing would be impractical in the short-term because nowadays large supermarkets have centralised purchasing and supply arrangements.

Furthermore, *Life without Lorries* notes that British businesses have been particularly successful in their pursuit of efficiency through the synchronisation of manufacturing and distribution operations. This is manifest in dramatically increased stock turns, reduced inventory holdings and reduced retail storeroom space close to point of sale. The efficiency gains have improved the competitiveness of British industry, whilst simultaneously increasing its dependency on a rapid and reliable road transport system.

The report suggests that even after a stoppage had ended it would take some time to replenish grocery stock to normal levels due to capacity constraints in production, handling and transport. This would extend the recovery time by limiting the extent to which the supply chain could ramp back up. The report suggests that the indirect economic impact on individuals, industry and public services would likely be enormous and lists the impact on different sectors of society.

In relation to the requirements of this study - disruption to supply of food/ threats to health – *Life without Lorries* suggests the impact on society would manifest in two ways:

1. Reduced availability at point of sale.

2. Potential increased hazard to human well-being from inability to dispose of waste food at each point in the supply chain (i.e. from farm, factory, distribution centre, retail outlet and home).

The study also suggests that urban dwellers hold lower household stocks of food than their country counterparts, with poorer urban families and the elderly (who shop frequently for small quantities) being most readily affected[3]. Workplace catering,

[3] For further reading on the grocery distribution, shopping habits and the vulnerability of cities, see '*The Validity of Food Miles as an Indicator of Sustainable Development'*, Defra (2005).

schools and hospitals would also be vulnerable, with catering in these institutions likely to break down within the day. The latter would also be vulnerable from a waste disposal perspective, a finding supported by earlier Cranfield research (Christopher et al 2001).

The impact on agriculture would vary depending on the time of year. Most livestock producers would be only marginally affected during the summer months. However, the research suggests that poultry rearing operations carry lower holdings of food stocks than farms rearing other livestock. Slaughtering would be severely disrupted, as most livestock now travels some distance by lorry to the abattoirs. Meat, which could not be moved rapidly to packing and refrigeration, would likely be wasted. Milk supplies would be extremely vulnerable, regardless of season. Arable crops and fruit would also be wasted in vast quantities if the stoppage occurred during harvest season.

The limitations of the *Life without Lorries* study are set out in its terms of reference. First, it was purely hypothetical, and the scenario was very unlikely to occur so abruptly and completely. There have been only two instances in the past quarter century when the road freight system has been seriously disrupted (lorry drivers strike 1979 and Fuel Crisis 2000). Neither occurred without warning, both took several days for the actions to take effect and even at their height some road freight transport continued to move. During the fuel protests supply chains were only disrupted for approximately 3 days. The second limitation of *Life without Lorries* is that it assumes that the disruption is announced as temporary and consumers are advised that there is no need to 'panic buy'. Consequently, it was assumed that consumers would remain calm and that consumption rates would remain at a constant average. It is acknowledged that purchases would increase exponentially, if (as is likely) panic buying were to occur. Third, the research assumes that only Lorries of 3.5 tonnes or more would be affected with smaller vehicles continuing to run. It is accepted that in practice the withdrawal of the larger vehicles would displace limited volume to smaller fleets and cars, unless affected by fuel shortages.

Life without Lorries provides some useful pointers for this study, and some of its predictions were supported by the findings of 'Exercise Gemini' a government/industry simulation exercise conducted on 10th May 2006.

1.2.3 Risk and business continuity management

As a discipline BCM's stated agenda is moving firmly in the direction of the Board Room and, in some respects, its current (theoretical) positioning shares a number of similarities with the 'function' focus of the 'Integrated Emergency Management (IEM) approach embodied in Civil Contingencies doctrine. But on the ground the BCM discipline remains fickle in terms of its priorities. A survey conducted in 2002 by the Business Continuity Institute in conjunction with the Chartered Institute of Management (Chartered Institute of Management 2002) showed that loss of skills ranked first in the list of threats to business continuity experienced by companies in the previous year (2001/2) and second (behind loss of IT) in the range of threats managers most feared. A more recent BCI survey of 251 managers undertaken in the first quarter of 2005 showed that large scale 'physical' disasters, topped by terrorist attack (28%), were seen as the most prominent threat to business continuity in the forthcoming year. However, the same survey indicated that the principle drivers

behind BCM were existing customers, rather than direct compliance with corporate governance and regulatory requirements, as had been the case the previous year (2004). In terms of actual measures in place in the food industry itself, a recently published survey (Moor 2005) of 1000 risk managers suggests that almost half had business continuity plans in place. However, the survey also indicated that:

- Business continuity remains insufficiently resourced in retail, food and beverage organisations in the UK.
- Where business continuity plans exist, they remain untested
- Many boards have failed to recognise the role of BCM in meeting corporate governance requirements.

Moor's survey again raises the link between BCP/BCM and the corporate governance agenda and, whilst PAS 56 might encourage organisations to recognise that most corporate crises may indeed be 'quiet catastrophes' affecting single organisations, there are clearly examples within the food and drinks industry that are not. Publicity over possible GM contamination, together with Europe-wide legislation demanding improved traceability in food chains (Food Standards Agency 2005a), has focused the food chain on quality throughout the supply chain. The detection of Sudan dyes in Indian chilli products in February 2005, resulting in product recalls affecting over 570 lines of processed foods supplied to stores in the UK (Food Standards Agency 2005b), has heightened awareness of the complex systemic nature of our food supply chains. Moreover, food supply chains have been central to several of the most widely cited creeping crises.

1.3 Large-scale disruptive challenges overseas

Whilst 'creeping crises' may have emerged as a phenomenon within the UK, overseas, sudden onset disasters have held sway. The 9/11 international terrorist attacks on New York and Washington, and subsequent bombings in Bali, Madrid, Istanbul (and in London), followed by a spate of large-scale natural disasters - including the 2004 Asian Tsunami, and in 2005 by the drowning of New Orleans - have all pushed the international emergency planning debate back towards sudden onset emergencies.

1.3.1 Security and 'The War on Terror'

9/11 marked the beginning of a widespread change in attitude towards issues of supply chain vulnerability. It is now widely recognised that the terrorist attacks of 9/11 did not themselves cause any significant disruption to global supply chains or even North American industry. But the reaction of the US authorities did (Sheffi 2001). The closure of US borders and grounding of transatlantic flights caused massive disruptions to commerce and international trade, prompting an outpouring of press articles (mainly in the US) highlighting the terrorist threat and the frailty of international supply chains (e.g. Aichlmayr, 2001; 2002; Lee and Wolfe 2003; Harrington 2003).

The Customs-Trade Partnership Against Terrorism (C-TPAT) and the Container Security Initiative (CSI), introduced early in 2002, are examples of how the U.S.

Department of Homeland Security is adopting 'best practice' approaches to supply chain management (mostly derived from automotive manufacturing) to ward off the terrorist threat. More precisely it is adopting a combination of Total Quality Management (TQM)-inspired process control methodologies and technological solutions to improve 'visibility' of in-bound cargoes to the US. It is also applying the 'membership criterion' of the managed production network, as seen in supplier management programmes of the large automotive assemblers, to extend their operational locus of control beyond the legal boundaries of a single firm. In this instance, the principles are being applied not to another company, but to other countries as a way to extend US border controls.

Under the CSI programme a small number of US Customs and Border Protection personnel have been deployed, to designated ports around the world, to work with host nation counterparts 'to identify all containers that pose a potential threat' (CSI 2002). To minimise the resource requirements of the programme (for the US agencies), C-TPAT has been introduced. C-TPAT is a TQM-style self-assessment programme for manufacturers, carriers, and others involved in the import of goods to the US. Participating companies provide detailed documentation of all security practices and their management processes to US customs authorities for inspection. Once customs officials have visited the company and approved the application, containers from the authorised 'known shipper' can be expedited through US customs and security checks. By 2004 over 7,400 'partners' had enrolled, including 86 of the top 100 US importers, who accounted for 96% of all US bound maritime container traffic (C-TPAT 2004). Under the scheme, each shipper is required to supply electronically the details of the cargo not less than 24 hours before loading. However, if the characteristics of the consignment deviate significantly from earlier consignments by the same shipper, it may still be subject to manual checking before loading. Around the world national or supranational customs authorities have followed the US lead, adopting similar mindsets and similar measures.

Whether these initiatives provide what Lee and Wolfe (2003) describe as 'security without tears' is a moot point. CSI undoubtedly seeks to reduce congestion and the cost burden at US ports of entry, which it achieves by pushing security checks back up the chain to a limited, but growing, number of approved ports of origin around the world. The ports of exit are required to invest in technology to provide the shared data environment necessary for the programme to work effectively, as well as the required technologies to quickly pre-screen suspicious 'high-risk' containers. The US authorities choose to present the costs to overseas counterparts as 'insurance', claiming that CSI protects the port and the national economy of a CSI host country. In the UK, however, port and airport congestion has continued to rise (Turner 2003). Furthermore, no legal framework was put in place ahead of implementation of the US requirements to deal with data protection issues, liability for delays arising from processing errors, or damage to cargo during inspection (Pysden, K. and Perez-Goldzveig, S. 2003).

1.4 Research into supply chain security and the terrorist threat

In the post 9/11 climate, combating the terrorist threat to supply chains in general became the central theme of numerous research programmes, by professional associations and a number of leading universities in the US and elsewhere. In the US an overriding preoccupation with terrorism, possibly at the expense of more 'effects-based' approaches to crises or disaster management, is now regarded by some to have been a mistake. It is cited by those concerned as a contributing factor to the chaos following Hurricane Katrina (Lipton 2006). Nevertheless, the majority of high profile mature and on-going research programmes into supply chain risk or resilience were initiated before August 2005 and have anti-terrorism as their point of departure.

1.4.1 'Securing the Supply Chain'

The US-based industry association, the Council of Logistics Management, (later renamed the Council of Supply Chain Management Professionals) was amongst the first to publish a report in response to 9/11. The weighty document, entitled *'Securing the Supply Chain'* was prepared by Central Michigan University, focussing on aspects of civil emergency planning and disaster management (Helferich and Cook, 2002). The report is essentially an extensive 'source book' for supply chain professionals, providing them with an introduction to disaster management and 'off the shelf' solutions in the form of tried and tested disaster management templates. Publications from US Government Agencies and well-known voluntary relief organisations are also included, as well as case studies for educational purposes. The templates are based on US Federal Emergency Management Agency's (FMEA) approaches, notably the Standard Checklist for Business Recovery. As such the report adopts traditional disaster/emergency management perspectives and reinforces the focus on localised, sudden onset emergencies.

The work includes a bibliography of over 300 publications identified using key word searches of ABI Inform and Nexus Lexus databases or Internet searches. Key words included: supply chain disasters; terrorism; natural disasters; disaster planning; mitigation; disaster detection; disaster response; disaster recovery. On the downside, threat-based (rather than effects-based) taxonomies are adopted throughout, categorising the threats as 'Intentional human illegal acts; unintentional incidents (human accidents/mechanical failures); intentional human; and natural phenomenon'. The work relies almost exclusively on US sources and advocates checklists based on specific, readily identifiable threats i.e. semi-frequent natural disasters e.g. floods, hurricanes, wildfires, earthquakes, and 'terrorism'. However it's 'Chronology of Terrorism' which purports to be a chronology of terrorism in the US and around the world in recent years (1972-2002) suggests a rather selective view of terrorism. Inspection of the Chronology shows that with the exception of attacks by anti-capitalist groups on targets in Italy (March 1978) and Japan (March 1995), only acts of terrorism perpetrated against US and Israeli citizens are included in the list. This in turn raises the old issue of 'one man's terrorist is another mans freedom fighter'.

Creeping crises appear to fall beyond the scope of the study. Gradual on-set disasters are recognised, but limited to environmental pollution, erosion and climate change. Moreover the work explicitly excludes 'Intentional Legal Human Acts' – i.e. disasters caused by economic, social or political changes.

1.4.2 'The Supply Chain Response to Terrorism'

Following 9/11, The Centre for Transportation and Logistics at MIT (Massachusetts Institute of Technology) began a programme of research into the (US) *Supply Chain Response to Terrorism*. To appreciate fully the impact of the responses on a firm and its supply chain, the project scope initially entailed studying the response to terrorist attacks (and similar disruptions) from several different perspectives – i.e. the risk management community; the insurance industry; the US Government; and the response from shippers, carriers and agents along the supply network. The study looked at both the experiences of past disasters and the use of Real Options thinking to assess the potential value of flexibility in supply chain design in responding to disruptions (Rice and Caniato 2003).

The research included a literature review and one-hour telephone interviews with around 20 managers (mostly representing 'shippers' – i.e. manufacturers) and resulted in a well written and useful report detailing the US response to the terrorist attacks. It begins by pointing out that although some businesses were crippled by the attacks themselves, notably some of those with offices and staff inside the Twin Towers, the vast disruption to supply chains following the events of 9/11 was caused by the reaction of the US government. That reaction continues to affect the flow of goods into the US. The impact therefore extends to all firms around the world conducting business across US borders. The researchers also note that the [US] research and publications presented in their literature review provided useful insight on how to deal with terrorism. However, few focussed directly on supply chain issues. Those that did were based on theoretical or conceptual approaches rather than empirical work.

The MIT study draws a clear distinction between security and resilience in supply chains. The two are interdependent, but not the same. The report argues that ultimately companies will need to design for both security and resilience, as a secure supply network does not guarantee a resilient supply chain and vice versa.

The study focuses on supply network security, which it defines in terms of 'maintaining the integrity of the product'. Actions to improve security can be classified in three ways:

- Physical security
- Information security
- Freight security

The report lists 'basic' and 'advanced' approaches to each, with 'basic' used to describe traditional practice. 'Advanced' involve more forward thinking approaches, including the proposed US 'Transportation Workers Identification Card'. The Card is designed to prevent "enemy from within" scenarios by creating a common database for assessing drivers' security levels.

In contrast, a definition of resilience materials science is adopted, which is *'the physical property of a material that can return to its original shape or position after a deformation that does not exceed its elastic limit'*. Two approaches to resilience are identified. The first involves flexibility, which entails creating *capabilities* within the organisation to respond – mainly achieved through 'just-in-case' investment in infrastructure and resources. This may involve a multi-skilled workforce and designing production systems that can switch rapidly and supply networks with alternative sources of supply. The second approach involves redundancy, which is about *maintaining capacity* to respond to disruptions in the supply network. These measures may include, inventory holdings and redundant production capacity, or committing to use third party production capacity whether required or not, and to maintaining a dedicated transport fleet.

The research found that most companies' responses were purely reactive. They were simply complying with regulations and other mandates. Those which had more sophisticated programmes in place were companies who had previously experienced major disruptions and learned from the experience. They emphasised supply chain collaboration, intensive training and education and sound strategy development. The research identified Business Continuity Planning as a measure that could improve both security and resilience, along with designing systems to 'fail smartly' using layers to provide backups, aggressively training people in the organization, and making security and resilience part of the company's culture.

1.4.3 'PROTECT: Protecting People, Planet & Profit – Towards Secure and Reliable Global Supply Chains'.

'PROTECT' is one of numerous national or EU funded research programmes currently underway with a view to improving port and transport security. As such it echoes the CT-PAT security agenda. The four year (2005-2008), €1.5 million research programme is funded by TRANSUMO (http://www.transumo.nl/en/projects/protect.aspx), a fund for strengthening the Dutch Knowledge infrastructure. The project is led by Erasmus University Rotterdam, in partnership with TNO, Buck Consultants International, Port of Rotterdam, Dutch Customs, Transport & Logistics Netherlands, Holland International Distribution Council and the Dutch Shippers Association. The project aims to give companies and organisations involved in the international flows of goods entering into Europe, particularly via the Port of Rotterdam and Schiphol, a solid knowledge base that will help to make their businesses more secure thereby contributing to more reliable and secure global supply chains. Phase I was completed in 2005 and dealt primarily with project management matters, threat analysis (points of failure within the networks that make them susceptible to criminal or terrorist interventions), the development of security measures and a single case study pilot project. The results include reports, recommendations and insights, including a priority listing of security solutions that are deemed to be suitable for large scale implementation by organisations operating within global supply chains. Phase II (2006-8) focuses on practical solutions, namely technological, policy and operational solutions that businesses and policy makers will be able to implement in their daily operations, hopefully making regulations more efficient and better suited to the practical demands of business.

1.5 Food chain security and the terrorist threat

The vulnerability of the food chain is well recognised in the post 9/11 security environment, particularly in the US, where companies have been encouraged to adopt new measures to protect food supplies. In July 2005 new voluntary guidelines were issued by the Agriculture Department for meatpackers, shipping companies and retailers. Under the recommendations, companies were asked to check for vulnerable spots in the shipping (transport) process where terrorists could poison food with harmful bacteria or chemicals. They were also provided with a range of procedural guidelines, outlining new duties for drivers and including requirements for processors to check shipping company security programmes (CBS News 2005). The recommendations also reflect the findings of some recently completed and on-going research programmes previously outlined in this review (e.g. Rice and Caniato 2003).

Elsewhere, other reports suggested that the role of public health infrastructures in identifying and managing a bioterrorism outbreak should also be recognised. Writing in *The Lancet*, Sobel, Khan and Swerdlow (2002) draw inferences from unintentional food borne disease outbreaks, pointing out that detection of outbreaks of food borne diseases depend on the ability of clinicians and public health officials to recognise clusters of illnesses. Similarly, a report by the World Health Organisation's (WHO) Food Safety Department (WHO 2002) into the *Terrorist Threats to Food*, responds to the concerns of Member States by stressing that outbreaks of unintentional and deliberate food borne diseases can be managed effectively by the same mechanisms; *"Sensible precautions, coupled with strong surveillance and response capability, constitute the most efficient and effective way of countering all such emergencies, including terrorism" (p1).*

In April 2004 the US Department of Homeland Security announced that it would support two university-based research consortia to help develop ways to protect the US food supplies. These agro-security programmes are to receive $33 million in research funding over three year (2004-7). Details of both programmes, one dealing with malicious interventions and the other with livestock diseases, are provided in the following sections.

1.5.1 'Securing the Food Chain'

A Department of Homeland Security funded consortium is focusing on food security. Named the National Centre for Food Protection and Defense (NCFPD) (http://www.fdp.umn.edu), the research programme is led by the University of Minnesota and draws together researchers from Michigan State University (MSU), North Dakota State University, the University of Wisconsin-Madison and expertise from twelve other universities, independent research facilities, state health and agriculture agencies, professional organisations, food and agriculture companies, and private sector consultancies. The terms of reference for the programme are restricted to finding cost effective ways to secure the food chain from illegal malicious human acts i.e. 'deliberate contamination or terrorist attack'. Therefore the work focuses on prevention and detection of criminal or terrorist attack rather than resilience.

MSU's contribution to the NCFPD programme is expertise in Supply Chain Management, Food Diagnostics and Criminology. It takes a 'farm to fork' view of

the supply chain, which includes farmers and growers, commodity traders, manufacturers, wholesalers, distributors and retailers. Other critical service providers are transportation companies, government institutions and port operators. Supply chain activities to be considered are material procurement, manufacturing, warehousing, transportation, inventory management and customer service. Research methods are qualitative (interviews) and quantitative (statistical analysis).

The MSU research carries a dual focus - consumer safety and brand protection: *"Not only is it necessary to maintain a secure food supply to provide ongoing nourishment, the North American food system also supports significant economic activity…food safety concerns can impact industry viability and the value of enterprise brands as well as safety"* (Closs 2004). Industrial 'partners' in the research, including some of the large US branded food companies, *"realize that not only could a terrorist incident have severe health implications for thousands of people, it could also have severe financial repercussions for the firm and the overall economy for reasons of legal liability and consumer confidence"*. Increased security, it is argued, would prevent the product itself being contaminated, but also would prevent the contents of vehicles being replaced by either dangerous substances or terrorists.

The NCFPD work is a continuation of MSU's earlier research into supply chain security, which began in November 2003 with an IBM sponsored workshop for industry (all sectors) and government – including Department of Homeland Security, US Customs and the Transportation Security Administration (Closs and McGarrell 2004). Some initiatives were identified that would improve security, these include:

- Physical security of buildings and processes
- Certification of domestic and international trade partners and carriers
- Applications of technology to track and trace product movement and responsibility. These often extend traditional anti-theft and contraband measures, by preventing unauthorised people and substances entering the food chain away from facilities.
- Increased inspection and standards to make sure that processes have not been compromised.
- Formal or informal certification and other auditing processes are used in some instances to verify the integrity of supply chain partners. The researchers note that this is increasingly challenging for international supply chain operations.
- Global Positioning Systems (GPS) and Radio Frequency Identification (RFID) to provide methods for tracking the movement and location of consignments.

1.5.2 'High Consequence Foreign Animal and Zoonotic Diseases'

The second Department of Homeland Security funded programme is under the auspices of the National Center for Foreign Animal and Zoonotic Disease Defense. Led by Texas A&M University's Agriculture and Bio-terrorism Institute, the consortium includes the University of Texas Medical Branch, University of California

at Davis, University of Southern California and the University of Maryland, working in close collaboration with Homeland Security's Plum Island Animal Disease Center. The research programme will study 'high consequence foreign animal and zoonotic diseases' including Foot & Mouth, Rift Valley Fever and Brucellosis and Avian Influenza. Its aims are three-fold:

- The development of new diagnostics and vaccines
- Provision of new methods for assessing the consequences of alternative strategies for preventing, responding to or recovering from outbreaks.
- An educational outreach programme.

Further details of this programme are available from the Center's website: http://fazd.tamu.edu .

The threat to the food supply chain from animal diseases, including Avian Influenza and the possibility that H5N1 might mutate into the next human flu pandemic, received very little attention from academics working in supply chain management research until very recently. In March 2006 the Centre for Transportation and Logistics at MIT began a five month qualitative study into supply chain preparation for Avian Flu/pandemic flu. The study will therefore still be underway on completion of this report.

Section 2. Business Continuity Management in the Food & Drink Industry

2.1 Introduction

This section of the study reports on what the participating companies were actually doing in terms of Business Continuity Management (BCM). It examines how companies are implementing BCM, who is responsible, when these measures where introduced and why. It also looks at formal efforts to implement inter-organisational Business Continuity Planning (BCP) with other parties in the supply chain. In short it aims to:

- Assess the extent and quality of Business Continuity Planning/Management in the food and drinks industry in relation to a limited number of 'key' product categories.

It is worth noting that there was no formal consensus on terminology or the scope of BCM within the participating organisations. Moreover, no attempt was made to impose academic definitions. Instead participants were encouraged to interpret the terminology in whatever way was meaningful to them, by expressing their views, experiences and the policies of their organisations in their own terms. Consequently, what constitutes BCM in one company may well carry a different label elsewhere. The term BCM is therefore used loosely by the managers quoted in this study. Most made no formal distinction between proactive effects-based BCM and threat-based approaches to operational risk management, corporate risk management or any of the other related sub-disciplines.

2.2 Why are companies doing BCM and when did they start?

The smallest companies involved in this study, the independent retailers, were involved in limited BCM purely for the purpose of immediate short-term survival. For them BCM was limited to basic IT protection, security (e.g. protection from ram-raiders) and some form of contingency plan for the failure of a wholesaler. The independents had no desire, incentive or resources to pursue more comprehensive business continuity or risk management programmes.

For the larger companies BCM was part of a more complex risk management agenda. They were increasingly engaged in formal risk management for reasons of corporate governance compliance, linked to this were matters of brand protection, corporate social responsibility (CSR) concerns, and past experience of serious disruptions.

The supermarket operators/wholesalers gave the following explanations:

> *"The BCM heritage predates Y2K. For the best part of 5 years the company has had a very structured and disciplined culture of compliance at branch and at all levels… The rational and culture has always been there, but has become more formalised with corporate governance requirements. There is a greater perception and awareness that supply*

chains are less resilient. People are more aware of potential threats, and trained to think about risk more than in the past. The ethos in the industry has changed. There is greater pressure to demonstrate that processes are in place. Good managers don't just think on their feet".

"12-18 months ago corporate governance was lacking in this company. Two things have changed since then. The first is the appointment of a new Company Secretary, the second is the impact of Enron etc in the US. The company now has to follow a very structured corporate governance approach cascading down from Sarbanes-Oxley legislation".

"Business continuity is driven by CSR, a strong risk management culture and part of maintaining a competitive advantage…BCM is good practice. Earlier Corporate Governance Reviews identified the need, plus the implications of Sarbanes-Oxley - the possibility that the UK might follow that model of legislative director and executive responsibility. There is also recognition that BCM gives a degree of confidence to business partners and insurers. There is greater emphasis on this, following incidents such as Buncefield and increasing fears over a possible flu pandemic. Such events could hit our overseas interests or sourcing arrangements. Even 7/7, whilst not directly impacting on the Company, prompted us to look again more seriously at Head Office security".

High profile 'external' threats were clearly increasing awareness of possible disruptions and to some extent advancing the case for BCM. The retailers were, by virtue of city centre locations noticeably more 'bomb aware' than any other cohort involved in this research. One of the organisations had lost a member of staff in the 7/7 attacks, but it was earlier IRA bombing campaigns that had first legitimised business continuity concerns.

"It was nearly 10 years ago now, but an IRA bomb went off, it was the second time the IRA had bombed the area. I think that woke the Head Office up a bit, we were in the exclusion zone for the first 24 hours. There was a day when we weren't allowed onto the site. That made business continuity cover for this specific site become more of a conscious decision…An employee from the Group died in the 7/7 London bombing and I think that shakes people. I left America about two hours before the attack on the twin towers, where we'd been inside. People at home knew we had been there, but we were in flight".

For the largest transport companies, corporate governance featured, along with fuel protests, but BCM provision was largely customer determined.

"Corporate governance is a driver. It followed questions from the non-executive directors. Turnbull and the corporate governance agenda made the board aware of BCP. It is audited by the internal audit team. BCP in the company predated Y2K and 9/11. The old plans were site-specific and produced where customers required them. They were more crisis management blue-prints that were never tested or formally managed. A predecessor emphasised the need for security, but this has been an on/off theme. There has been more of a security emphasis post

9/11, but the company is not believed to be a major terrorist target. A big storm is likely to be more of a problem, if it stopped the vehicles going out".

"BCM has become more topical over the last 5 years. Interest was driven first by the fuel crisis. Customers often provide templates for audit, not specific procedures. Different clients specify different requirements. Some require BCM others do not. Most of the company's contracts with customers have agreed disaster recover plans. The big food companies do require them".

Amongst the key category food and drink suppliers all agreed that interest in BCM was growing. Just over half of the companies were UK subsidiaries of very large multi-nationals. In these organisations an increased emphasis on BCM tended to be driven by Group level corporate policy, often linked to negative experiences suffered by others within the same Group.

"Business Continuity is driven by the requirements of the [non-food] division, and because the US company has a BC department. The company has always audited for financial risk, but nowadays is very much concerned with Sarbanes-Oxley compliance…Hurricane Katrina made BCM a very big issue in the US, resulting in a groundswell of interest and meetings on BCM and risk analysis on the supply chain."

"In the UK business Y2K created a flurry of interest in BCP. That died down after the millennium. Then the company received an approach from a big supermarket in 2001/2, which produced another flurry, but then things went quiet at their end. Internationally, there is a high level of awareness of dependence on computer systems. This has increased following disruptions caused by a cut cable in Germany and an outage throughout Italy, which lasted 2 days and cost millions. Italy had a major outage while handing over its systems to IBM. The UPS [uninterruptible power supply] burst into flames and burned the servers. More recently, we have installed fully integrated business process systems using SAP and centralized global IT service provision. BCP has become business critical. It is a mandatory requirement, mandated by the Group Executive Board".

"Business continuity has been around in the company for a few years, but it has not always had this high profile. It is much more rigorous now. The drivers are twofold: (1). It is part of corporate assessment. (2). Changing nature of the supply chains as they become more efficient, with more focused factories, quicker response times, and lower levels of stock. There is a need to have contingency plans in place. It all means that the impact of low likelihood events is increasing".

For some of the smaller UK-based food processors, and some of the ingredient suppliers, the demands of business interruption insurers or customer requirements had prompted a move to more formal approaches to BCM, though most were aware that they had some way to go before they were close to best practice.

> *"We are doing a bit of BCM. We started a few years ago. It was customer pressure. When big global customers have a scare they take more interest and then look at their key suppliers"*

> *"BCP is about 4-5 years old. It was prompted by a big hike in insurance premiums and lots more requirements…The rationale was the control of risk and to get the business interruption insurance premium reduction. Had tacit level contingency plans, but nothing formal in place. We are now more vulnerable, since we now have some key activities all in one place".*

> *"BCM is gaining acceptance. We have not yet documented all the procedures, but just done an exercise on contamination and doing a half day exercise with a consultancy. They are looking at our procedures ready for the new British Standard. There is no indication yet as to what is required for post-PAS 56. We are doing this ready for customer requirement and the Full British Standard… More people are asking whether the company has BCP, but they are not yet asking to see evidence. It started off with product quality/safety. Now it is much more about business interruption and the ability to supply customers. The change in approach reflects the change from small family business to a national UK business supplying major retailers. 85% of the business goes to the big retailers...We produce one of the biggest footfall products for the major retailers. This has become a bigger risk for us because of all the new business we have taken on".*

Floatation on the stock exchange was a very clear driver of changing attitudes towards BCM, bringing Corporate Governance concerns to bear. In fact changing ownership structures, or change in top management teams, were the most frequently cited reasons for increased emphasis on BCM.

> *"The company is doing BCM, but haven't got a whole organisation plan yet, but we are building one up now. The master plan is not finished. The overall emphasis hasn't changed in that it is to keep things going. But because the company status changed and we became a PLC quite recently, that brought in corporate social responsibility, corporate governance and risk management issues. The business has developed rapidly since then and the challenge is keeping BCM up with it".*

> *"Because of low margin/profitability issues, the company has no formal BCP. Looked at it 5 years ago but concluded 'too difficult, too expensive, maybe not necessary'. This is reflected throughout the category. Our major rival is the same, the No.3 is slightly better. The industry struggles for investment and is managerially 'lean and mean'. It tends to favour quick response reactivity to a crisis…We have always had a non-leading edge method. As part of floatation the company got*

up to speed with risk registers, assessment methods, risk mitigation and risk screening. These are reviewed on a regular basis".

"We set up risk management about 3 years ago. The company has only been in existence for 5 years. It was done by the internal auditor, and is a key focus for the audit committee. No other change since then. It was done in recognition that the company had to be more organised with risk management. It was brought up by a non-executive director".

2.3 What are companies doing for business continuity?

The finding of this study revealed that every organisation, large or small, had taken some measures to protect critical information and limit the damage from an IT failure. In addition, managers from every company were acutely aware of their legal and moral obligations for food safety and traceability, and for Health & Safety compliance to protect the wellbeing of employees and customers. These three core concerns underpinned the development of all subsequent measures to improve operational risk management and formed the basis of BCM.

2.3.1 Product and process control: food safety, quality, traceability

Food safety regulations were clearly the starting point for most operational risk management processes employed across the sector, with the larger retailers and wholesalers devoting considerable resources to policing stores, distribution sites and in-bound supplies. They were particularly vigilant with own label produce, because of the potential for negative brand associations.

"We monitor in store and in-bound for own label. Formal policies and procedures are in place to ensure food safely in stores and at distribution centres (DCs), including pest control. The Food Safety Act 1990 triggered due diligence as a defence in law and created a requirement for in house teams to facilitate a due diligence defence if required. The post-1990 position is better in an outsourcing environment".

"Food is a very regulated and controlled sector – and the most important for brand reputation e.g. with pesticides, the suppliers must be hugely below the requirements – we go for overkill against regulation. For food safety the company has 35 different audits e.g. the Ice Cream Fridge Audit… Financial risk was always well controlled but there are other areas of risk – big broad issues of risk reporting e.g. massive reputation issues – product safety/legal; duty of care; health and safety for colleagues and customers; environmental protection. These cut right through and cross accountabilities within the business, from suppliers/manufacturers through the food chain, deliveries to DC, deliveries to stores; in store storage and intermingled are technical product teams at Headquarters…These risks are more than CSR – they are hard and fast risks e.g. a recent big e-coli outbreak in Cardiff could

hit the business. If it was a big retailer responsible, it would affect it for years".

"My team interface with our suppliers and with our stores to a certain extent. We're responsible for making sure that the products we sell under our own brand are safe, consistent, fit for purpose and that they comply with the policies that we have in terms of composition etc. I have a team of 20 people who go out auditing suppliers and looking at product quality, and at issues with product in stores, I am also responsible for all QC's in our temperature controlled depots".

"Business as usual', means supplier inspections, chilled chain inspections, and meat quality checks at depot. Colleagues are moving to be based at suppliers not the depots. These are embedded processes. A contaminated product is a major issue so we have to be very focussed with upstream checks".

The large third party logistics providers told a similar story.

"The site managers follow the legal requirements, for Health & Safety and site responsibilities. They must also follow temperature and food safety requirements. Big customers conduct audits every 6 months and report back on a 'red, orange, green scale'. There are food integrity checks and the company monitors sell-by dates".

All of the larger retailers, wholesale, food manufacturing and ingredient producers had well established product recall procedures. In fact one business continuity manager complained that in his organisation BCM was simply regarded as an extension of product recall procedures. In all the larger companies product recall procedures were supported by reactive cross-functional 'crisis management teams' or 'incident management groups'. Most of the formal crisis management structures had been introduced within the last 5 years. Once established, the same structures are being used to respond to a variety of other eventualities. The teams comprise nominated specialists who would gather quickly to manage an unfolding crisis. The composition of the team reflects the skills sets required to manage a particular event. Logistics and supplier management specialists were well represented in the crisis management teams.

"Below the Executive Board there is a crisis management team with nominated stand-ins...We've had a crisis management team in place for around 4 years. It is definitely a bigger concern now. We had a false alarm with a malicious contamination hoax last year. Product contamination or shortage is a bigger issue for the big retailers than the loss of any one store…For product recalls we have specific procedures in place. The procedures define the criteria for an 'incident' vs just a normal occurrence, how procedures escalate, and who is on the incident team, their roles and remit using functional specialists".

"The crisis management committee builds on existing practice 'blocks' rather than a going for a comprehensive 'Apollo 13 manual' - how to get Apollo 13 back!"

"Crisis management has been company policy for the last 5-6 years…Traceability legislation etc. has helped to focus efforts. This has formalised procedures. We have worked through issues like product contamination and product recall e.g. where to dispose of spoiled product. We do live drills for product recalls. For crisis management different people are in charge depending on the event – senior management and operational staff – e.g. a vehicle on the M1 hit a crash barrier and blocked the road into Luton. We have everyone's phone numbers and guidelines. The Distribution Manager got a phone call at once and had staff there immediately. We only had to wait for official authorisation to move the vehicle".

"For product recalls the crisis management team uses a lead function model. The team leader interfaces with any and all other stakeholders. Also in terms of PR, the leader draws on internal/external expertise/agencies as they feel is necessary. For a food emergency it would be central government. The team arrangement offers greater flexibility and utilizes existing knowledge/expertise, which is better than a rigid formula and instructions… Supply chain functions – including distribution and internal supply chain activities and trading are all represented on the crisis management team and in the risk management forum".

In some of the companies these reactive structures, established for compliance purposes, are used in conjunction with internal risk management forums, where functional heads meet regularly to report known weaknesses within their operations or potential threats looming on the horizon. 'Horizon scanning', used in conjunction with established reactive vehicles for threat-based risk management, allowed a proactive response to external factors that might pose a threat to the continuity and well-being of the business. This was most apparent in organisations with extensive international sourcing operations. However, some companies had made a deliberate decision not to look beyond normal business scenarios.

"*The company is very sensitive to world issues. We subscribe to some international intelligence gathering services and have dedicated staff monitoring world events for possible impacts on the business. The company is trading in several countries outside UK and conducts business all over the world through its international sourcing operation".*

"We have horizon-scanning processes. If you see something, the process is to set up an Incident Management Group (IMG) "There are 6 core and two or three floating members of an IMG team. They include someone from the Communications group – the head would be seconded, Head of Government Relations/Trading Standards and PR, Retail, Logistics, Trading and Forecasting. If it is a petrol problem then the petrol rep comes on board, if it is farmers then it's Fresh Produce. That group updates the Executive. The Executive owner comes on board if the problem is big enough… The way the IMG works has not changed,

but business continuity has changed significantly e.g. there were no fuel or bombing contingencies in place. Now there is much more focus on off-site contingencies. This was prompted by the fuel protest and terrorist activity. A bomb might close the whole place down".

"On a regular basis all Department Managers and Supervisors meet and look at all the risks faced by this part of the business. These are then categorised in terms of likely to happen/frequency. We then review the actions already being taken to mitigate the risk and work on all the items to see what risks are not 'fully' covered. These are allocated to groups to work the issue and report back the actions required. We monitor our performance on completing. This happens at a minimum of once a year and covers many departments across the company. A risk manager is used to facilitate and assist the process. Think that the company has looked at everything e.g. relocating staff/factory operations (the main site is near an airport). We have strategic stocks here…We have to take a pragmatic approach, we can only deal with major risks, smaller or more remote risks are passed by".

"We plan on forecasts and note quickly if it deviates from 'normal'. We don't do horizon scanning etc. There are so many possibilities".

2.3.2 Mission critical assets and activities

In theory best practice BCM has moved on from IT disaster recover, to the protection of mission critical data, to protection of mission critical assets and, more recently, to mission critical activities. Clearly not all of the organisations contributing to this study had made the complete journey in such a structured and systematic way.

At first glance the large retailers appeared to be the most sophisticated, being more Mission Critical 'activity' than physical 'asset' focussed. Their vigilance in policing safety and quality in their own label supply chains is recognition that their principal asset is their brand reputation. Beyond that, critical activities are those that would impinge on the key business processes.

"Business Continuity is MCA focussed. Head Office is encouraging each of the functions to develop a BCP template. Plans are not done for 'non-essential functions'. Our BCPs are process-led: Customer, Operations and Finance. Rather than planning for every aspect of the business, the focus is on those key processes which impact all three criteria. We are working with the process owners to get BCP in place, and a programme of ongoing maintenance and training for staff. We have recently secured funding for company-wide training in BCP. It would be difficult to identify every possible risk and plan for them or mitigate them. There is a key risk register but because the BCM is effects-based not threat-based, we plan for and focus on the prompt/realistic recovery of our key processes….Pre-2001 the company had over-detailed plans that were not fit for purpose. Y2K prompted a review and the Director concerned decided that they needed a revamp, he got the sign off from the CEO. He was given a steer to keep it simple and low cost…"

The large grocery multiples' own retail activities enjoyed a high level of resilience because they are dispersed across many sites. Head Offices and large regional or national distribution centres (NDCs) were more likely to represent points of failure within their operations. People were recognised as critical assets.

> *"Different kinds of businesses have different priorities and MCAs. This company's approach is to work out what infrastructure would be needed to keep operating. Have worked on what would be done in case of a depot, store or Head Office closure and how the business could operate if there were fewer people. It focuses just at the level of the top 100 tasks – key phones, off-site working, payment etc".*

> *"The company does not have specific continuity plans for each branch. If one suffered a power outage, freezer breakdown, fire, bomb threat etc. the risk management manual has instructions and procedures. The managers all know who to contact for advice/specialists because of the close knit nature of the company. The risk control group issues instructions and reacts and recommends policy changes etc. It does not rely on consultants for this. Changes in safety policy have to be personally sanctioned and signed off by the CEO".*

> *"There are plans in place for Head Office, but not for the stores. The view of things is you loose shops all the time, you have fires, and deal with them when the time comes. There are plans for distribution. We have decided that for the total loss of a depot we can manage from the remaining depots in the network. We have a plan in place that's updated regularly so if we loose any depot, which other depot will do each of the stores. The nature of the business is that you can always force a bit more out of your site. The limitations are more likely to be the number of people you have got and the amount of equipment you've got. If you loose a site, it is built into the plan that you would move staff, and you would hire agencies, you would hire trucks. In the 'War Room Manual' we have a list of contacts to coach companies, hotels, agencies, materials handling equipment hiring, vehicle hiring etc. So if we have to move to another site, we would know how much extra volume we are going to do. You can quite rapidly calculate what that means in terms of people and equipment."*

The food processing companies and ingredients suppliers with operations in the UK, took a very different approach. Health & Safety and Loss of Site were the principal concerns, not least because their operations were likely to be concentrated in a very small number of sites in the UK (or across Europe).

> *"We look at vital operating assets. We have the IT core systems, back office and a factory at one of our sites".*

> *"The big BCP activity is around sites and loss of asset scenarios. There are plans for if a factory burns down, what could be salvaged in terms of equipment. Suppliers could help with other requirements e.g. power etc".*

"We have had plans in place at site level for the last 5 years. They have developed from Health & Safety Executive risk assessments, but now have plans at the macro (inter-site) and site level and have had experience of some disruptions elsewhere within the wider group. Our joint-venture parent had disaster recovery specialists for a fire at a site in 1997. We looked at costs from that and the contract costs and decided to prepare and make contingencies…We are following our joint-venture parent's corporate guidelines".

"Major plant maintenance involves careful planning for Health and Safety and to avoid disruptions to customers and to manage stocks. We have a strong safety culture, it is a big priority on site. Plant is set up to run 24/7 all year. It needs to be kept going as a continuous process. From a safety point of view we do regular fire drills and safety checks (e.g. dust is a risk for explosions)".

The packaging companies did not formally distinguish between BCM and crisis management. In fact they saw crisis management as part of the normal everyday operational and risk management activities. BCM was business as usual.

"For us BCM is risk management. It is the responsibility of the main board, down through the plant manager. Risk management KPIs are part of the operations managers' bonus scheme. There has been no change in policy, the company has always managed risk in this way. The senior team are all involved. We have 4-5 main board directors. Four get together on a monthly basis to look at risk. Most of the time is on risk management, which is protection of the company's assets including the staff. We make sure the equipment is safe and that fire risks etc are limited. All of this is limited by cost. Its risk vs cost. Twice yearly audits are undertaken by the insurance underwriters. The Group spends a lot of time on risk management. It improves the premiums. There are no plans for loss of site, but we have a crisis management plan".

"Most of the formal work is on Health & Safety. It is the primary concern at all board meetings. The company records all events, problems or near misses…It looks at disaster planning by plant. We would shift production from one plant to another".

Four of the companies who participated in the study did not produce any products in the UK and were responsible for distribution only. These included the largest producers in two of the most politically sensitive 'key food' categories. For these companies critical activities were UK office functions, with principal dependencies being IT and transportation.

"BCP is a Group level requirement, they have defined core processes that we need to protect. BCP is not like Y2K preparation because it involves the whole business. All line managers were interviewed to find out what was needed and for how long. The company has not planned for every eventuality. There was no conscious decision to say no to anything either. We haven't an exclusive list, but plan mostly for IT and

transport…BCM is all IT driven. We have disaster recovery with a specialist provider."

"We plan for flood, and fire at the DCs, for docks strikes and IT loss. The servers are in a secure facility and have disaster recovery in place and back-up 65 miles away. The company's UK Head Office has computer links backed up, and there is back up for customer service, but not at the operational sites".

"Risk management is done on a functional basis. We don't have formal crisis management as such. Don't use BCM as a term. It is more risk management orientated. We are mindful of food scares and could mitigate for them, but have no formal plan. Have IT backed up off-site. Whether an asset-based or MCA approach is used is up to the individual managers. The company doesn't own much in the way of buildings, just administrative activities e.g. customer service, sales, all else is support. The company is a commodity network broker and has an 80% + share of business in some parts of the country… We use 'what if scenarios' e.g. a sudden increase in demand if there is any hint of a fuel scare and we have plans in place for bad weather or if protesters were likely to blockade depots".

"We don't refer to it as BCM formally in any way. The whole business is logistics and supply...We are not the same as a manufacturer with big capital plants investment/dependencies. The company could find replacement assets quite easily but have just not got round to it yet! Other cold stores are available in the UK and we could replace stock quickly. There is always a batch on the way and we would make contingency purchases. We plan and make provision for strikes on ferries etc. Shipping delays, customs, and the possibility of a customer depot strike, because we would have to cope with that. We couldn't just go to direct to store deliveries without some time to plan".

For the transport and Third Party Logistics suppliers (3PLs), their mission critical activities were their business and they planned accordingly. They have no asset base other than people and a head office. On-site BCM for distribution centres was largely dependent on what the customer was willing to pay for. Furthermore a spokesman for a transport industry association stressed that when it came to business continuity provision there were considerable differences between the largest and small or medium enterprises in the sector.

"The company manages outsourced services, but does not own the assets facilities, trucks etc - the only thing we 'own' is the people. The company works with its customers in an 'open book environment' (i.e. cost plus), providing expertise and labour. Customers own all of the capital assets, which fall under the customers' BC plans. Where customers have no BC coverage in place our company provides a basic local site specific level of cover for fire, bombs etc, plus press office and media links… The issue of who is responsible crops up. We liaise with customers' ops people and will often pass enquiries to our Business Continuity & Risk Manager. There can be no clear delineation between

our company and the client. Staff have dual requirements, to this company and to the clients, which often raises the question "who do we work for?". To save money, maintenance – i.e. fixed maintenance, fuel, electrical, security, property management and its maintenance - is all fixed price and is arranged by the clients. This affects all 3PLs".

"We plan for people, power and road blockages i.e. alternative routes. Most contracts are open book, with costs passed on. Customers may be willing to pay for good cover and some customers audit the company".

"There is a big difference between the big companies and the SMEs. Big companies have plans in place for almost all eventualities, small ones don't. Last year the Association put together a guide on how to put a BCP together, but the Association can't force its members to do anything, it acts as a conduit for the spreading of information".

2.4 How are companies implementing BCM: processes, structures and tools?

This section reflects the findings of questions about how BCM was managed, including the tools and processes in place. The results revealed that only around a third of companies were looking to the New British Standard, PAS 56 or mentioned other established business continuity templates to advance formal cohesive BCM programmes. Most of the others relied on a combination of crisis management teams, basic risk management tools - notably risk registers and Likelihood x Impact matrixes - or Health & Safety audits. The truly global companies were the ones that were most obviously moving towards standard procedures for risk and business continuity management, detailed planning necessarily reflected local conditions.

"The approach to crisis management is strongly process driven, it laid down basic principles that were applied across the group, but detailed management is devolved to country level. The requirements and potential crises for operations in a country like the Czech Republic would be very different from those in the Far East e.g. Thailand. The biggest risk in the former would be organised crime, in the latter it would most likely be typhoons".

"The company is an international operation and there is a recognition within the department that what works in the UK doesn't always work elsewhere. There is a need to be culturally aware and an opportunity to learn a lot from other countries and regions, and to transfer appropriate knowledge to create new best practice".

As a cohort, the large retailers and wholesalers were amongst the most sophisticated in terms of adopting formal BCM tools.

"The company does have a risk management model for risk analysis in place across the business based on Frequency X Impact…For BCM the Business Continuity Institute's (BCI) standard approach is used. The

company uses BCI models, with standard tools for risk analysis and business impact analysis. The 'Temple' model is useful here [see Figure 2.]"

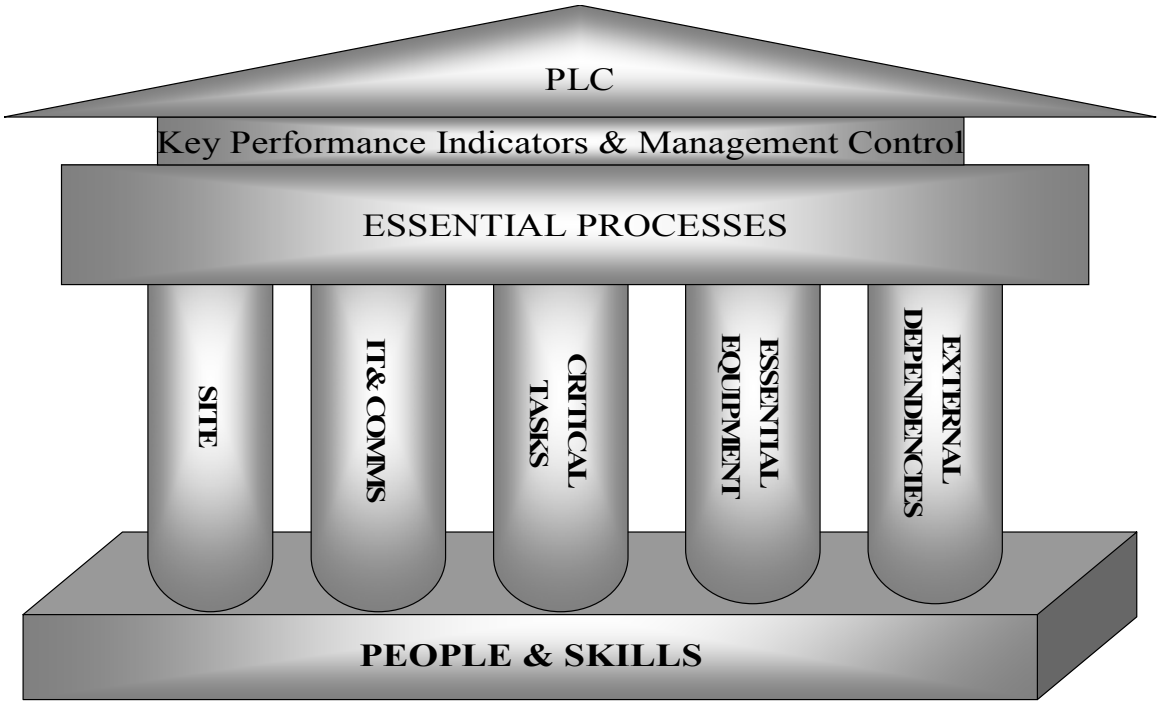

Figure 2. The 'Temple Model' for Business Continuity Management.

In retail distribution there was an emphasis on project management at site level, although some of the retailers and large transport companies were also applying continuity planning across the sites using corporate templates.

"When we do projects – they are done very systematically, including risk management. There are always workshops on 'what can go wrong?' The scenarios are usually 'what if the IT doesn't work?'. The emphasis is on pre-opening project management not continuity. It is all about project delivery, about establishing the business. We have a list of 600-700 risks through project management to implementation. The company has got very considerable experience on this from a Health and Safety perspective. We don't really worry about terrorists because we're not considered to be a target. We do tests for things like legionella, but don't really consider natural events, though they have had flooding after heavy rain".

"For project management the company uses part of the 'Prince 2' toolkit – this gives a framework to score risk by likelihood x impact. There is a working group to draw up a list of risk and issues, who discuss as a group and input into the database to give an initial scoring. They discuss what could be done to reduce the risks. A revised assessment is done by the system and each core working group meeting reviews these to see whether it is still current and what if anything had

changed. It is slightly bureaucratic and laborious but heads off major problems".

"There is a central control that cascades BC out. We have a large number of sites, all our sites are covered by one plan that we put together. Nominally we report in and keep a steering committee abreast of what we are doing, but they tend to have concentrated on what happens to Head Office. What we are planning for is to cover us in the event of a loss of a depot. That includes ambient depots, fuel depots and frozen depots. The process originally followed business continuity rules set out by the Australians. It gave a structure to how you do risk assessments, leading into plans. It started off with some work done on the risk assessment for the business - what were the things that would adversely affect our business. The 3 main ones that were established were loss of power, loss of computer systems and total loss of the site. Our planning ran ahead of the rest of the business, but there are a set of templates that the business now uses".

"The risk management team use a mixture of hazard-based and effects-based approaches and have built upon the earlier work within the business. They have developed basic cards for emergent hazards such as SARS and Bird Flu. The company worked with a software provider to renegotiate and refine a software tool to help managers keep their plans up to date. There is a CBT support training data base to help the roll out and tools on the database to assist the business e.g. with proposal documents. The Business Continuity & Risk Manager manages that database and is involved in the development of risk management processes. A global blueprint box-set was developed from there. Contingency plans for the Head Offices are in place and for key IT sites/centre. Some of these are written by external consultants – with the associated problem that they are not kept up to date".

The 17 large food processing companies, drink, ingredient suppliers and packagers involved in this study almost all relied crisis management teams and on standard asset/threat-based risk management tools, such as Likelihood x Impact matrixes and risk registers.

Amongst the food processing companies and ingredient suppliers, it was the large branded multi-national companies that were most likely to be using specific BCM tools and that had the most sophisticated and comprehensive crisis management /BCP systems in place.

"We have formal recording of crisis and formalised crisis reporting system in the manual for 'anything that is not a local incident', i.e. anything that involves food safety, natural environment, emergency services and authorities, health of employees, customers and neighbours. There is a dual reporting procedure. One is the crisis channel and the other is the management channel. We have a named crisis team and deputies. All functions are represented, with legal, environment and risk management for all sites. They carry contact numbers at all times. We have numbers for the European company and

worldwide, the FSA, and specialists if required. There are 16 copies of the manual, all are recorded within the division. The company is audited each year on BCP, if anything is not satisfactory, there must be improvement plans and updates. All aspects are built into managers' performance measures/bonuses".

The majority of other companies involved in the supply of key foodstuffs were not so proactive or well organised, though some were moving forward with the help from overseas parent companies or specialist consultants.

"The company does have crisis management procedures, but the matter has been elevated, and will cover any crisis. Everyone has been given a role. It's a well-defined procedure from product recalls, a very robust system is in place. There was no formal Supply Chain involvement, but now there will be. The Supply Chain Director definitely will be involved in BCM…The US has given a presentation on risk analysis and risk assessment, using a traffic light system for high, medium, low, likelihood x impact. Focussing on the 'High/Highs' High impact has to have priority".

"The company has a crisis management structure for product recall purposes etc. We are doing an impact assessment – likelihood x impact matrix by site and are starting a corporate risk register for corporate governance. The BCM structure has a steering group and site by site analysis for breakdowns. We are currently putting in back-office and front-office reviews. The company has engaged a 3rd party to do a BCM project at one of our main sites, to help put a BCP together. Within the business there are people with manufacturing expertise going through the factories and we are now looking at key suppliers. The factories and procurement are engaged for alternative sourcing. We also have technical and customer services involved in the review. Most Head Office supply chain functions are centralised within the business. The operations director has this on his radar screen".

"Our consultants are looking at our BCM procedures ready for the British Standard…We have business interruption insurance to cover the switching costs between sites, but that only covers some costs and we are now at full capacity. The nature of the business is low stock so business interruption insurance is not the answer. We have a risk register which uses an impact x vulnerability matrix. We look at industry issues, then at our company specific issues. All are gauged. Originally the company did a full Board brain storm and had consultants in to do electronic scoring for them – selecting issues out of the High Impact/High Likelihood corner of the matrix. Some have dropped out because they are unlikely. The risk register is updated annually. All directors score all the risks, not just those in their own function. We will open this up to operations management next year to do a comparator. The big risks are generally those that it is not possible/practical to control".

BUSINESS CONTINUITY MANAGEMENT IN A FOOD PROCESSING COMPANY

"Here in the UK we began by using the Zurich Hazard Analysis system to identify all key business processes and assess them for probability of occurrence and the potential impact of an occurrence. This was far too detailed and bureaucratic. There was a spread sheet with around 350 lines – but we focussed on selecting mission critical activities. We modified the approach and expect that our simple, flexible and generic approach to BCP should serve us well in all eventualities. It is more in line with BCI best practice (and to an extent with PAS 56 guidance) in that it involves Business Impact Analysis (BIA), specifically:

- *The ability to capture customer orders for our products within 24 hours of a crisis,*
- *The ability to deliver the customer orders for our products within 48 hours of a crisis,*
- *To be able to pay our creditors and invoice customers within 1 week of a crisis,*
- *To be able to communicate effectively with staff, our sites, customers, suppliers and the media after a crisis.*

We list all key business processes for a department and detail their criticality for delivery of service against the four objectives. Key departments are those involved in these 4 activities, other departments are not deemed to be critical for BCP purposes. Customer service is critical and so is distribution, including factors like pick lists and vehicle movements. Then we focus on whether there are potential workarounds to the process. We look at how long we can continue without SAP [enterprise planning software] and use the workaround, and any 'milestones' in terms of data or timing.

Each department was asked to come up with something. Many were reluctant but eventually came round and cooperated. Most areas had to act within 24 hours of an event to maintain activities and most could only maintain operations for up to 2 weeks. Some believed they could hold out for up to a month. We define the resources needed for the Mission Critical Activities that fall out of the BIA. We concentrate on eight generic Business Disruptive Scenarios (BDS):

1. Loss of Key Staff (food poisoning, epidemic, injury, natural disaster).
2. Denial of Access to the office or site (fire, flood, terrorism, neighbour's problems).
3. Loss of Power to the office.
4. Loss of Data or access to data.
5. Loss of Telecommunications (telephone, fax, etc.).
6. Loss of Key Equipment/Machinery.
7. Loss of Transportation/Warehousing/Distribution.
8. Loss of Reputation.

From the BIA, Resource Requirements, BDSs, we formulate a Business Continuity Plan using our own generic BCP template. Supply Chain specialists are involved in BCP for: Order Capture, Warehousing, Distribution and Purchasing, for their own departmental and functional areas. They mesh with the company's BCP processes in that they support the first two or the four BCP Objectives. Some departments need one or two sub-plans, but generic templates work for most. We also do trend monitoring within the factories for key lines. The company makes 65% of its profits from one product family and around 25% from just two products within another. All other products together account for less than 10% of profits".

Given that Health and Safety concerns provided the impetus for a number of companies current BCM/operational risk management programmes, it was no surprise to find that Health and Safety management tool-kits were mentioned. Environmental and retailer driven accreditation schemes were also in evidence, with some companies also using tools from these as the basis for risk management and BCM.

> *"At the factory level they are likely to look at the micro and macro factors. It started as HSE-led risk assessment following procedural approaches for Health & Safety. In the event of an accident it is 2-3 minutes before the Blue Light services would arrive. There is an annual assessment with insurers and annual declaration to Head Office, using terrorism audit which is run out of quality group (food security). There are terrorism audits on site and ingredient security. Have been doing this for a few years and looking at e.g. train crash with flammable materials or a lorry drives into the gas tank – we prepare for various accidents …Each security lodge has a file with all registration plans e.g. drains and how to get rid of waste water. This is very important for sites near a river. We have had discussions with the insurers. It is likely to be more expedient to let the factory burn down than dispose of waste water".*

> *"We are HASP and ISO 9001 approved. All sites will be 1401 environmental approved as well and British Retail Consortium approved. Risk registers are included in these".*

Managers from at least a third of the large companies involved in the study freely admitted that their companies were not in the vanguard of 'best practice' when it came to formal tools and process implementation. Nevertheless their organisations had often made provisions for specific 'known', high-likelihood events. One company did flag up the need to have some formal facilitator present to act as an 'overseeing eye' when different groups were undertaking Likelihood x Impact analysis to avoid common, but relatively low priority themes (big risks widely dispersed) falling through the net.

> *"There is a crisis management team…In a situation they are all involved. I've no awareness of formal BCM/BCP. There are no on-shelf plans, it is reactive. The company makes provision for strikes and negotiates wage rounds each year. It has contingencies in place for management staffing, sourcing products, and for the 3PL to move to external depots and for fuel protests".*

> *"We don't have formal BCM processes or tools, but product recall training and crisis management is reviewed and updated every 6 months. Environmental issues are picked up in routine monitoring, but we don't try to identify everything. There are no check lists, but we do use a Health & Safety risk register and are going through processes (started early 2006) of doing IT-based BCP. We have a lot of that documented already".*

"It's largely manual, we do brainstorming. We don't do anything as sophisticated as failure modes effects analysis, we don't get to that level, it tends to be more generic. Did some Likelihood x Impact analysis".

"We ran a series of workshops with internal audit facilitating to prepare risks registers for each department. The audit team were able to pick up reoccurring themes between departments that might have been lost because they were not the highest impact for any one department, but important for the business".

"The company is very brand aware and audits all the way back to the feed mills, to manage supplier risk e.g. supplier viability, financial risk, and maintain a watching brief on vulnerable companies. We do have formal procedures, but what to do and when is decided at the time. It is driven by commercial reality. There's an informal crisis management team of the same individuals who are always called together, nothing formal or written down. They rely on decision making in smoke-filled room when it occurs…There is a risk management group at corporate level, it is largely insurance focussed, for business interruption insurance. There is no large scale investment for back-up office or IT facilities. None of that here! We have ICT links through two exchanges that go under the same bridge! We are looking at microwave options instead. There's no formal template or tool set, nothing like that here. It's not the culture, but we do watch global events and pay lots of subscriptions to information sources."

"BCM is not a formal process here in this company. This site is new and it's a very new organisation. There is lots of instinctive informal operational expertise, but not formal processes beyond a product/category-based approach...The Business Process Manager is working on processes the role has expanded from IT to look at how people work. The company has IT disaster recovery and triangulation between the company's two sites and the IT provider's site. We have automatic links between sites for Voice over IP, phone and data links. There is a disaster recovery plan drawn up by consultants for if a site burns down, that is owned by Health & Safety. We have plans for up to 3 hours/days/weeks that states who should do what and everyone's roles. These were held by a senior management team and an exercise is planned. That has not happened yet. Having difficulty in finding the time".

2.4.1 Tests, drills and displacement planning

The findings outlined in the previous sections confirm that many of the companies involved in the study are currently working to get initial BCPs in place. For those companies, testing plans remains some way off. Nevertheless, some of the organisations had moved to consider full displacement planning or live testing. Around a third of the companies had developed displacement planning for essential Head Office functions, though few had tested them. Another third had short-term displacement planning for production or distribution centre activities. Some of these were tested with formal drills involving switching around 10% of volume to

alternative sites. Whilst around a quarter of the companies conducted product recall and IT migration drills on a regular basis.

> *"We run product recall scenarios including traceability. These are real full rehearsals for 48 hrs. All have brought out significant learnings in what were believed to be robust systems".*

The most experienced managers recognised that continuity plans were not an end in themselves, but part of an on-going process. Their preparation was useful in that it identified potential problems. The downside was that they could take considerable management time and effort to produce and maintain. Exercises are a further refinement, in that they test the plan, often highlighting wrong assumptions. However those who had taken the process one stage further found that in simulated emergencies staff rarely consulted the plans at all.

Some examples of progress towards testing and displacement planning are provided, starting with the retailers and wholesalers.

> *"For business continuity planning purposes a set of 30 key people in the business were taken to run through a major incident. The company has a depot converted to run the business about 30 miles away from the Head Office. The group made 3 working parties to look at different issues e.g. denial of access or dealing with emerging/potential problems e.g. contamination in a rival company's supply chain. Consultants have been used to help work through the operational infrastructure issue and get 100 work sites in 24 hours and 200 in 48 hrs. We have worked out who is needed at minimal cover. Then how would it work for 3 or 4 days. We have also set that up for the stores".*

> *"The company does a range of testing from walk through to scenario based tabletop exercises and live testing with specialist agencies. Some are based on criminal scenarios, some on operational. We are planning to do a pandemic flu exercise…We try to do walk through/workshops/tabletops or inter-agency exercises once a year. Head Office is looking to try a relocation exercise in 2007. It is an escalating plan e.g. local disruption within a building, displacement planning and then full scale test for the loss of the total HQ. It will involve 1500 people. HO has been asked to identify who is critical, who needs re-housing, who could work from home and who can be redeployed in store. It is more difficult to do this for the distribution sites…The company has a default 'warm' site for 350 people. It also has a concept centre for product testing, which could take up to 650 with some notice. The company's offices are not in high-profile locations, and should not be impacted as collateral damage e.g. from a terrorist attack on other targets. We have made a purposeful decision not to identify a warm site for the call centre in Bangalore. It is low risk with no single point of failure".*

> *"The company has emergency desk space at its IT provider nearby, which is bomb/tank proof. It has high levels of continuity planning and drills for loss of IT or HQ site. The company could take a team to the*

supplier's data centre nearby or to a location over 100 miles away. Supply chain activities could be run remotely from there…The company does test IT systems, it does live tests and restarts from time to time to make sure the system would come back up. The IS company provides infrastructure back up to get the company running again. It is a requirement that it has to be resilient to 'known' failures. The company does not hold drills for loss a DC because of the impact on performance measures".

"Each department has their own business continuity manager...This year they have done a priority list, because we do have office accommodation at a facility. We have a steering committee and are about to finalise the plans. That gives the requirements for the Group as a whole. The organisation looked at what would be essential to the business and Customer Service would certainly be one of the first to go. The fact that we are open seven days a week and late into the evening means that Customer Service are around when nobody else is. We looked at the business to see what we would need. IT and certainly HR are up there too. Some activities have offices at more than one sight so they would transfer from one to the other, but customer service haven't got that luxury. There's the freephone support as well, we would have to patch that one over. It could be used by the business as well in such an event as an easy point of contact. We are about to do an exercise [September 2005] to see how that would work. The procurement people are based in regional offices so they would transfer. It's a geographically dispersed business which in some ways that makes it easier".

Amongst the food companies it was again the large branded multi-nationals that were furthest along with testing and displacement planning.

"As part of our performance measures we must demonstrate media training. We have simulations, TV rooms etc. We have done product recall tests to track, trace and recall product. Disaster (IT/IS) recovery has been tested: IT went in April 2006 to our service provider's disaster recovery centre along the M4 to see whether all services and applications etc. can be recalled. In May 2006, a full test was performed at their disaster recovery centre in with our key staff performing simple operations. For displacement planning we have syndicated facilities that give 40 seating positions with IT and communications etc. Allocation would be proportional for widespread disruptions. We have agreed a 400m exclusion zone for other users so local disasters are not a problem. Also have second option sites. The supplier has a good track record… We have also looked at various options e.g. displacement to another site, alternatively the purchase of a small dedicated site. Option 3 is a partnered facility e.g. our service supplier's facilities. For a short-term local event that would be OK, but in a national or large scale event would only give us 2-3 desks which is not viable. We could run remotely from our European Headquarters,

but if the infrastructure here was disrupted that would be a big problem".

"All plans must be formally reviewed, tested and updated annually, but we are only just moving to testing now. We are doing desktop and localised displacement testing, but have yet to do a whole or part activity relocation test. The business has several 'tests' a year of food-related incidents e.g. product recalls initiated internally or externally. Currently any testing we do is at a local, departmental level. Wider tests tend to be based upon a Call Tree communications test. A recent Call Tree test was around 40% successful…We are going for displacement planning, but have not gone through any of the social issues, child care etc. for that yet. The company has no dedicated standby facility in the UK (the company has one in America). It was judged to be too expensive. We looked at equipping part of an old factory or office, but this too was felt to be too costly (around £70K)".

The following responses are more typical for the UK-only food processors and ingredients suppliers.

"There are lots of things that we plan for but they are mostly short term. Procedures do need to be updated and we do some full-scale drills, but these need to get more scientific… Routinely do product contamination and recall simulations at each site from raw inputs through to distribution and routinely test Head Office for problems with major systems. We do trial runs with sites (and packaging) and routinely switch production from one site to another… We have 5 sites in Britain and are very able to switch between sites to cover a short term problem. We are going to test for an IT problem soon, but we are going to roll out the exercise for a longer disruption, though staff think it is going to be for a short term problem. Most of the PLC directors have worked in the business for a long time and came up through the ranks, we will split the exercise between the PLC Board and Operations to prevent the Board overriding Ops".

"We have some of our most vital assets on one site. We have IT disaster recovery, and are working on displacement planning. Don't know whether it is to other sites or a separate facility yet. No full scale drills yet, but have tested IT disaster recovery".

*"*W*e could operate from our distribution site, but couldn't run like that for a prolonged period. We could relocate staff until temporary accommodation is available. There's no formal shadow office, but staff could possibly work from home".*

The issue of displacement planning for call centres and other Head Office functions was an area where several companies – from different sectors - admitted to being surprised to discover that lots of issues surfaced. Here are some of the lessons learned:

> *"Call centre staff have to be relocated in clusters, not as dispersed individuals. We are working with BT and telecoms on call centre provision".*
>
> *"When there is a major incident we find that customer service calls don't rise, they go the other way. The day of the London bombings we took 80% less calls. At one point we did ask someone to ring in to make sure there wasn't a problem with the lines, to check that they were still working. So people's perspective changes in the event of an emergency".*
>
> *"Displacement planning is not as straight forward as it seems. Relocating staff away from home offices can be a problem for single mothers, two career families with child care requirements as well as those with carer responsibilities for elderly of less able. Many of the potentially displaced staff fall into these categories".*
>
> *"There is a 3rd party relocation site that was thought to be only 10 minutes away, but is actually half an hour. This is not a full service facility".*
>
> *"If people have lap-tops they are encouraged to take them home and bring them in every day. It's no use having everything backed up for an emergency if you leave your lap-top at work".*
>
> *"For legal reasons it is recommended for purchasing to keep copies of contracts off site. Keep direct report contacts and line management contact details off site. Also keep a copy of external contact details off-site for vendors etc. Customer service has a 20-page list that is updated regularly off site. HR have staff lists off site".*

STAND-BY FACILITIES AND DISPLACEMENT PLANNING

"I am quite keen for more people to go to see the facility because I was quite shocked by what we would have. Perhaps naively I expected to roll up there and have a mini customer relations there eagerly awaiting my people. That visit did me good because you actually only rent the space and included in that space is a desk and a computer and telephone, but anything else you want you have to ask for. When I walked into a room that was just desk and computer. I was a bit taken aback, but it did make me realise what a difficult job it would be to transfer the functions. It did help me realise that on day one it would not be 'oh yes, six people can go'. I was truly shocked by this, when I asked for example 'where's the phone point?', "Oh its got to be in your requirements".

Plans have to be made in advance as to e.g. how we are going to transfer the free phone. We might have no IT for 24 hours so we have to make sure we have stand-alone. We have to make sure we have computer files backed up etc. so you have to ask each manager to make sure they have a 'battle box' [large plastic crate] with everything you need in there to keep you going for the first 24 hours e.g. store list, any forms that we need for customer relations, a minicom and everything else you'd need. Battle boxes are held at one of our depots, but these have to come back to be updated. The other one stays here. I didn't expect that it would need that level of detail. We have to think if we had nothing, what would we need? All that has to go into out plans, even before you move onto the next level of plans. The facility is in a location where it is not likely to be attractive to terrorists… or anybody…its just off the Motorway. There is absolutely nothing for miles around. There are a few facilities that we could use, but that is the one where we have been allocated our seats. It's a bit difficult because we have people here who are disabled and we wouldn't be able to accommodate those people.

My view was that we are not actually guaranteed a place at that facility. As far as I am concerned, yes, I will go to that location, but the provider made it very clear from the start that it is on a first come first served basis. What they do is say, 'yes we will give you some space'. They say that there are only 'x' amount of businesses within 'x' number of miles and they will do business with and you are guaranteed a set of seats and that might not be at the site you are visiting. That could be at your third site, which really needs to be built into the plan, because I work on the basis that my team travels backwards and forwards everyday and will be able to sleep in their own homes at night. I presume that most businesses don't actually have business continuity built into their employees' contracts. E.g. you are normally based in London, but for business continuity you are based hundreds of miles away.

Social commitments are one of the things that I have asked questions about. Looking from my own perspective, people who have children and other commitments may not be able to leave home an hour or so earlier than now and get home two hours later, so that was something I looked at very carefully. When I did my plan and said we need to almost eliminate those people with dependents from the plans. I'm not sure that many businesses consider that. It isn't in my contract or anyone else's, but I think it is something we should give consideration to".

2.4.2 Who is responsible? - Internal champions, dedicated resources and an uphill struggle

The managers involved in this study included the UK representatives of some of the best resourced companies in their sectors. The results from this section show that whilst BCM is undoubtedly gaining acceptance it is still far from being established as an integral part of the business culture in the food and drink industry.

Some of the largest companies had nominated individuals to move BCM forward in a structured way across their Groups. Yet the findings of this study indicate that experienced full-time BCM managers are rare. Most were part of the wider risk management or audit functions and had other functional responsibilities as well as BCM.

> *"My role is to ensure BCM is embedded within the company, beyond that to provide crisis management support and the wider role of managing loss prevention support for the international business… The company has templates for BCM and risk reduction plans. It has developed in-house training material and is now looking to develop some CBT to raise awareness within the organisation. This is needed because the company only has two people as a dedicated resource"* .

> *"I'm Business Risk Manager for the UK company, we are bringing all the operating companies together under the corporate umbrella. I'm part of the finance function and report to our national financial controller, with a dotted line to the business units. I've a range of responsibilities in terms of internal compliance and links to external compliance requirements – including SOX. We are currently trying to improve consistency across the business including looking at corporate policies as these vary between units. I'm also responsible for BCP at Head Office sites, and that responsibility extends to all other sites as a watching brief. The aim is to promote best practice, but site based plans require local knowledge. I also have data protection responsibilities and the company has a code of business principles which touches all levels of the business. That is key to maintaining reputation"*.

> *"BCM is part of the audit function, but it is not my only role. I act as a 'Centre of Competence' and the company's coordinator for Business Continuity Planning for the UK Market. I meet with the UK Crisis Management Team at their committee meetings throughout the year. I liaise and coordinate with the BCP Coordinators in the various business Divisions, Business Units, Functions and Key Departments. This is not about building an empire, it's about liaising and instilling the culture"*.

The vast majority of those interviewed for this study were new to the field, and/or were specialists in other disciplines who had inherited the responsibility for BCM in addition to their other existing workloads. In an environment where resources were stretched, BCM tended to sink down the list of priorities for those responsible and the operational management teams.

> *"In our business Risk and Financial Planning and the Quality Director have inherited BCM".*
>
> *"I'm Director of IT and Change Management. I've been in post for 12 months. BCM needed addressing, so I was asked to look at it on arrival. The Board is ultimately responsible. We have a BCM Group, but I've been tasked with driving BCM forward. Some BCM was in place when I arrived, but the company needed to do more. Other functional specialists are engaged and the business is putting resources in, but it is a continuous fight against everything else the business needs to do. There is no full-time BCM manager, it is all devolved… The business is fast growing through acquisition and its profile is changing which means that the businesses don't always have systems in place. The ability to respond is there but it is ad hoc".*
>
> *"I must say because and I ended up doing this other job, business continuity got moved sideways a bit and we haven't got on quite as well as we should".*
>
> *"The company has a Business Director for each client company. We are now rolling out business continuity. If I was to get the Business Directors together to brain storm about business continuity, they would look blankly and say they were too busy… I have spent no time at all on business continuity in the last 2 years. Ops managers rely on central functions to cover planning for those kinds of events and cascade down. It is a top down approach. ...I have a list of phone numbers for a call tree arrangement that has to be carried at all times outlining basic procedures e.g. vehicle fatalities. There is a central infrastructure of people in place. The big retailers would cover some of this but I'm not sure that the smaller retailers and some wholesalers have enough resources. The smaller retailers are slashing overheads and staff. With the big retailers, they will take the lead, the smaller ones look to their 3PLs to lead, advise, and add value".*
>
> *"I contribute to the six-monthly update of the Business Risk Plan spreadsheet, external factors such as fuel shortages or avian flu are included, but the Business Risk Assessment is quite limited and done by operational managers under sufferance. These are collated by the audit team. It is a distraction from the day job. There is no dedicated person for BCM in the organisation. Avian Flu may change that".*

Consultants were sometimes used to initiate the process, but the successful implementation of proactive BCM was often determined by the drive, persuasive abilities and persistence of isolated individuals within the organisation. If the

individual concerned moved, programmes faltered or went into reverse. Operational staff turnover exacerbated the problem.

> *"A global customer requested it and there was the post 9/11 feeling. We used specialist consultants who made us think about what we could do to be business as usual. That was handed on to one of our Directors, but it has slipped back to the usual crisis management measures".*

> *"There has been a problem with churn of staff and post holders and getting new post holders to acknowledge ownership of plans. They should be part of all managers' accountabilities. The problem is that some people see producing the plan as an end in itself. E.g. a 50-page long plan which is not fit for purpose in an emergency. It's a problem when we run exercises, the plans appear to be of limited value. BCM needs to be a core skill, not a bolt on".*

> *"People don't get round to doing it unless they are pushed".*

Another problem is the difficulty in demonstrating the business case for preventative BCM. Y2K has not helped. Some of the companies felt that they had wasted millions of pounds on Y2K preparation and were unwilling to make the same 'mistake' again. Without the costly lessons of a serious business interruption, it can be difficult to make the case for expenditure 'just-in-case'.

> "*Y2K was a double edged sword, it raised the profile but the legacy of a non-event is to make everyone think 'So? It will be OK'".*

> *"The team is very reactive, it would like to be more proactive but it has the problem 'how do you demonstrate value?'. When things go wrong the value is demonstrated e.g. with evacuations of staff from Africa, a shooting in South Africa and getting high value stolen goods back in Bulgaria… The first thing was to take the BCP out of security and make it a separate initiative and to review why the business was not bought in. It was cost, time and resources".*

> *"As a Health & Safety manager it is easy to secure regulatory compliance. Preventative risk/continuity/crisis management is much harder to justify and make a business case".*

BCM: ONE MANAGER'S EXPERIENCE

"I've worked in risk management team for 4 years and for just over a year in a business continuity role. My predecessor laid solid foundations but there was no support network within the organisation. He was ex-financial services – who are totally bought in to BCP. He sold the concept to the Board, but not the business budget holders. He developed a basic box-set that is used here on computer based system. A new philosophy has since been developed, whereby every site has a basic minimum crisis management plan as a first stage. Stage 2 is a questionnaire to identify sites that need more developed plans. But there has sometimes been a need to develop the BC plans in advance of the roll-out because of business or legal requirements. The approach is addressing crisis management sector by sector (including food), with business champions who support the initiative, know the business and can refine plans to suit their business. It creates ownership of the process.

The champions are doing this work as a 'bolt-on' to their responsibilities, but the centre is giving them the tools to manage in exchange. They also have a software tool to ensure that plans remain up-to-date. The centralised function advises the business. The rationale is that there was a need for a globally consistent approach.

The business is very low margin and provides delivery services to customers. There is pressure from customers – particularly grocery customers to keep costs down. BCP can be seen as a 'nice to have'. Not all of the company's several hundred sites need a full blown BCP. They can sometimes get cover from elsewhere. The cost of BCP for all the sites in terms of direct and managerial costs is enormous. Centralisation is the most cost-effective and efficient approach. Some sites would not know where to start or don't have the resources or recognise the significance. Mangers do move around within the company, but recognise the consistent approach".

There was also evidence to suggest that changes in ownership structures could derail attempts to improve BCM and operational risk management methods. Risk management approaches brought in to satisfy corporate governance requirements tended to lapse when further changes in ownership structures resulted in the de-listing of companies. Such changes are a regular feature of the food and drink industry. During the course of this research one of the participating organisations was taken over by a Continental European competitor, another has subsequently decided to divest itself of the 'key category' it was originally intended to represent in this study.

> *"Internal risk management processes are under review following changes in the company's ownership structure. Staff were employed within the PLC specifically to meet corporate governance requirements, it was a PLC preoccupation, the risk management heyday…The company developed an in-house database of all identified risks, but the risk register. The risk management approach was directly driven by Turnbull corporate governance requirements and corporate social responsibility concerns. The risk register included fire, flood/water damage, serious accident/fatality, severe weather, supply chain*

disruption, extortion, blackmail, managers taken hostage, and gypsies/travellers on site. Lots of work has been done on this within each area, though often the detail was not worked through. Following a change of ownership status (no longer a PLC), the database became dormant and the emphasis is now on the everyday concerns of the business. Crisis management plans are being rewritten because of changes in the 'family tree' reporting system".

2.4.3 Continuity planning with suppliers and customers?

All of the companies who participated in this study were asked whether they required suppliers (some or all) to engage with them in BCM/BCP for supply chain disruptions. Most reported that they did not. The retailers were starting to look into BCP provision with key suppliers, but interviewees indicated that the enquiries made to date were relatively superficial. Service providers and sole suppliers received the most attention.

"Generally it is seen as good practice that we should share our contingency plans with suppliers and learn from theirs. There is no specific requirement, merely to collaborate…It is a bit hit and miss. We try to get our people to acknowledge dependencies with suppliers, but it is not contractual. The company is involved in a number of partnerships and has shareholdings in other companies. Audits for Business Continuity arrangements have been carried out in them, including fuel supplier, financial services, database marketing/management company. They are all green on our traffic light system".

"Around 4 or 5 years ago the company identified and wrote to 20 suppliers who had more than £1m worth of business with this company coming from single sites. We wrote to them to check that they had contingency plans/procedures in place. All were very large organisations and they did. There were 5 questions that we asked them e.g. do you test the system? Have you got a nominated board member for this? Part of the supplier approval process for our own brand is to look at technical capabilities, hygiene standards, insurance cover and contingency plans in place. The company has never refused to do business with a supplier because it has taken exception to a BCP, but it has refused on the grounds of insurance. The company does not have formal plans with suppliers for catastrophic events. Nor with customers, there are too many of them, but would operate on a 'best endeavour' basis".

"We have very few service suppliers, we have a major 3rd Party Logistics Supplier that operates 2 depots, they are part of our plan".

Transport-dependent 'key category' food and drink suppliers, who relied on overseas production to supply the UK market, had a similar attitude to BCP for transport and distribution.

> *"Our sister company in Europe produces most of the product. Major suppliers are required to have BCPs, but the failure of a logistics company could disrupt our operations. With any other suppliers, including IT, we could go to back-up, but not logistics. Warehouse operators are required to have BCPs, transport companies no. Our 3PL has provided plans but they have not been followed up".*

> *"The [overseas] manufacturing site is getting interested in doing BCP with suppliers. Manufacturing avoids single source supply and has contracts in place, but we don't have any details. We have not asked suppliers of distribution services to get involved in BCP".*

However, the largest 3PLs were starting to question their own key service suppliers about BCM.

> *"The company has started to put BCP in contracts. It is a prerequisite for IT and data rooms. It is only done for critical service provision and then it is not yet at the stage where the company goes out to test service providers. It is not requested for vehicle spares or service".*

> *"Sometimes we look at this jointly with customers. We do not make it a condition of outsourcing agreements, but do have business continuity plans with some major suppliers, not all".*

The food processing companies and ingredient suppliers were increasingly aware that the large retailers were developing an interest in BCM in their wider supply chains, but confirmed that retailer interest rarely extended beyond questionnaires or sight of a plan. Only one food processing company involved in this research required evidence of BCP from its own suppliers as a routine requirement. Most were too preoccupied with getting BCM in place within their own organisations to think about broadening the agenda to other companies.

> *"When negotiating a contract or Service Level Agreement, we now ask all suppliers for BCPs as a matter of course, and for key suppliers, we ask about their suppliers. The plans are reviewed by the Supplier Quality Assurance (SQA) auditors. However, they are not experts in this field and, is my personal view, would be satisfied if a plan were thrust under their noses. As yet, we do not engage with our customers (retailers) on BCM. I personally meet with their BCM/P Managers and discuss common topics, but nothing formal is in place as yet. Initially one of the biggest retailers approached us in 2001/2002 to ask us about BCP. They even spoke of auditing our plans, but as yet nothing has happened. Another did send a questionnaire to our Commercial team in 2004 asking questions relating to BCP. The subject of reciprocal arrangements has been mooted with that customer i.e. helping each other if either of us suffered a Transport/Distribution/Warehousing problem, but as yet nothing has progressed. In theory, it would be*

possible to make direct deliveries to some of their largest stores without going through their own DCs".

"We do dance around the BCM requirements of one of our large retail customers. We fill in forms/questionnaires etc. The retailer is leading the way with BCM and did so with GM foods".

"Our big customers are the supermarket groups, we are category leaders with some, but not the biggest supplier to these. We have guaranteed service levels, but only had questions from one of them so far. We could go to direct to store deliveries, and are looking at the distribution network potentially to play a bigger role".

"We are under pressure to engage in joint BCM with some of our global customers, but we are only just getting there ourselves. All this takes money and resource that people don't have in abundance. We are facing up to the fact that sometimes it means talking to competitors about testing and auditing. We don't ask our suppliers about BCM".

"Customers expect us to manage the business to ensure supply, that's good supply chain management. Sometimes when we take on a new customer contract they may ask for self assessment. Big retailers have a different attitude to own label. They have very careful monitoring. We don't ask our main suppliers to do joint BCM, but do share forecasts and plan capacity etc. We share inventory management data but not other risk data/planning".

For raw ingredient suppliers, packagers and processing companies the emphasis was likely to be on established industry standards, which were mostly retailer driven.

"We require milk suppliers to be compliant with the National Dairy Farm Assured Scheme. That requires some emergency planning for loss of power. It is a 'First Purchaser Scheme' owned by the industry i.e. major processors, farm co-operatives, NFU, cattle vets and other stakeholders. The Scheme was brought in around 1999, it is audited by industry certified bodies and certified by UCAS. It was brought in as a requirement by large multiple retailers. It was not directly BSE related, but was related to all the food safety issues. It is linked to traceability and requires farmers to buy feed from certified sources etc".

2.5 The limitations of BCM: enlightened self-interest, not the 'National Good'

Managers from all sectors made it clear that the purpose of BCP/BCM was to protect the well-being of the business, its customers, employees and shareholders. It was not undertaken for the wider public good.

Efforts are therefore focused on maintaining everyday operations, under more or less normal external conditions, within the constraints of margin-pressured businesses. BCP may or may not include preparations to mitigate the effects of events that are judged to be 'likely', highly disruptive and beyond the control of a company, but this

is certainly not always the case. The following quotations, drawn from across the range of participating companies, summarise the ultimate purpose of BCM and illustrate its limitations.

> *"BCM is primarily to avoid interruptions that interfere with achieving profit and growth targets. It is to safeguard our investment in brand reputation and ongoing business improvements"*
>
> *"We expend energies on things you can manage and control, not the ones you can't".*
>
> *"We are not trying to consider major network failures, or looking at major road or telecoms networks. We are looking at what is 'within out control'. Flooding is outside, but we are planning for that. The limitation is to be determined".*
>
> *"We are more worried about the sites burning down than cataclysmic events".*
>
> "*We think of BCM as something related to internal disruptions not external factors"*
>
> *"We don't have disaster recovery plans for if something outside our control stops us working, but have multi sites and system contingency plans that are run from overseas".*
>
> *"This is a pretty decent business, I've worked for others and this is on a par with global businesses. All our contingencies are within what is commercially viable – we are benchmarking internally within the industry, not for 'best for public good".*

The reactions of the managers here relate to the purpose of BCM, that is not to say that they and their companies would not do all that was within their power to help in the event of a national emergency. Private enterprise will do what it can, but ultimately the 'business of business is business'.

2.6 From business continuity to humanitarian relief: lessons from Katrina

When Hurricane Katrina destroyed much of the US Gulf Coast, private enterprise stepped in where government and civil authorities failed. US retail giant Wal-Mart was in the forefront of the relief effort. The company currently accounts for around 10% of the $4.1 trillion in US retail sales each year, through just over 3000 stores. It employs 1.3 million workers in the US, making it the country's largest private sector employer.

Wal-Mart's willingness to provide information on hurricane preparation and relief for this study was confirmed in the Summer of 2005, only weeks before Katrina devastated New Orleans and large swathes of the surrounding states. Katrina underlined the need for integrated and effective local and national emergency planning. It also demonstrated how the logistics capabilities and distribution

infrastructure of the world's largest retailer allowed it to respond faster than anyone else when it mattered most. However it is important to recognise that what Wal-Mart did in the Gulf States went far beyond BCM. Distributing emergency supplies to displaced populations in temporary shelters free of charge is not an activity that a retail organisation would normally undertake in the course of its everyday business, nor is the provision of an emergency communications infrastructure and other social services. This was Humanitarian Relief. The company worked alongside other agencies such as the Red Cross providing the infrastructure, management and supplies that the state authorities were unable to muster in an acceptable time frame. The boxed example of Wal-Mart describes its emergency relief efforts. The catastrophe diverted the attention of key contacts for this study to the more pressing needs of disaster relief, but the information presented here was provided from press releases and via the company's head of emergency planning.

Wal-Mart's overseas interests include the UK supermarket chain Asda. However for the purpose of this study it should be noted that there are significant differences between Wal-Mart's operations in the US and in the UK. That is in part because UK is a densely populated island where retailers (unlike their US counterparts), do not have ready access to cheap land for storage at retail sites. The 9 stores with the highest sales in the Wal-Mart Group are all Asda stores in the UK. They have the fastest throughput and the highest sales density in terms of sales per square foot anywhere within the Wal-Mart estate. In fact the stores concerned are believed to have the highest footfall per square foot of any major retail stores in the UK. It is also worth noting that Katrina devastated an area around the size of Great Britain, and even the mighty Wal-Mart was overwhelmed by the scale of the disaster.

EMERGENCY PLANNING AT WAL-MART

Hurricanes are a semi-frequent occurrence in the Gulf States. Before Katrina struck in 2005, Hurricane Charlie hit the Florida coast. Lessons were learned from Charlie, which illustrated to Wal-Mart's top management team a need to ensure better visibility on the condition of stores and the whereabouts of employees during a storm. It needed to become better prepared to track lost power, network coverage and cellular phone communications after a disaster.

By the time Katrina appeared on the horizon Wal-Mart had an operations centre and crisis management team in place, ready to make decisions about prioritising activities and resources. The operations centre has a dashboard system which shows at a glance the status of each store in terms of damage, employees injured or at risk, whether communications platforms are running, whether they are running on landlines, satellite systems, and if a store is on mains power or generators.

Before Katrina made landfall, 45 trucks loaded with relief supplies were prepared and ready to roll at the company's huge distribution centre at Brookhaven, Mississippi. Amongst them were truckloads of water and ice, which were sent with police escorts to New Orleans. Wal-Mart knew from sales data captured in the aftermath of earlier hurricanes which lines surge immediately after a natural disaster. To ensure that the Brookhaven site could continue to work at capacity, the company secured special priority access to fuel supplies at a nearby filling station, so employees could get to and from work.

In total the company donated $20 million to disaster relief in the Southern states and dispatched 100 truckloads of free merchandise (clothing, nappies, baby wipes, toothbrushes, toilet rolls etc) and food for 100,000 meals. 150 internet ready computers were also dispatched to refugee centres. Meanwhile the company had set up emergency lines for employees to call in and which could also connect them to family members. In the event the call centre was quickly overloaded with 2,500 calls per day, so a second call centre had to be established, followed by a website where messages could be posted, firstly for Wal-Mart families, but this was then opened up to the wider public. It received 40,000 messages and 2 million hits. The company also despatched staff to emergency reception centres to look for Wal-Mart employees.

Katrina closed 126 Wal-Mart stores, and some were looted in New Orleans. Around 20 remained closed almost a year later, but the company promised jobs for all its employees somewhere within the network. In the short term it set up mobile mini-stores, including mobile pharmacies, to support communities along the Gulf Coast. It had learned from previous experience that the pharmacy system is crucial during an emergency to fill prescriptions for people displaced by the storm. The mobile pharmacies were connected via ICT links to a group of pharmacists at Wal-Mart's Head Quarters in Bentonville Arkansas, who worked to prepare prescriptions because the demand at the mobile sites was so high.

In response to enquiries for this study a spokesman for Wal-Mart emphasised that despite the planning, new lessons were learned from Katrina. He stressed that "although it goes against the grain to admit it, the biggest learning that came out of Katrina for them was local empowerment". A central operations centre was essential to co-ordinate requests from stores affected, but this soon became swamped because of the scale of the disaster. At that stage a strong message went out from Wal-Mart's CEO to managers on the ground to "do whatever you have to do". This empowered the local store managers to do whatever they needed to do locally (giving away food, water, clothing etc). This could be quickly backed up centrally by sending through the right products to the affected areas.

Section 3. Actual Disruptions, Near Misses and Known Weaknesses

3.1 Introduction

> *"It's not black and white. A day's disruption is OK, a week or two maybe? A month could be a problem. There is a possible weakness when everyday contingencies kick over to full-scale crises. The switchover period is potentially the most unpredictable. We always take the view that we switch first and ask questions later. Being alert is the key".*

This section identifies the causes of actual disruptions experienced by the companies involved in this study. These can come in near endless variety of guises, as the boxed item below indicates. It lists some of the more newsworthy event to have befallen just one global food company in recent years. However, this report aimed to capture not just actual disruptions, but near misses and known weaknesses too.

ACTUAL DISRUPTIONS EXPERIENCED BY ONE GLOBAL COMPANY

- *Storms in Italy that put out power to computer systems for week.*
- *Prague floods a year later took down order capability for a week.*
- *Flood in Carlisle.*
- *Fires in Latin America destroyed distribution centres.*
- *Buncefield fire closed a factory for 3 days due to smoke contamination*
- *3 extortion threats in the last few years*
- *Executives kidnapped and murdered in 2 parts of the world.*
- *Company suffered from 9/11 and had some casualties*
- *Crisis management team put on call for 7/7 London Bombings.*
- *Hurricane lifted the roof off a processing plant warehouse.*

Capturing lessons learned was something that most of the companies did some of the time. Attitudes varied, but many reported formal review procedures built into risk management processes. Near misses were sometimes recorded too, but quite a number of interviewees stressed that this was most likely to occur for matters related to insurance or Health and Safety.

> *"The crisis management group formally record lessons learned. The technical department record things that stray into their area. Health & Safety*

aspects are always recorded, but the general supply chain and operations etc are informally absorbed into the collective memory of the organisation".

Minor 'glitches' often went unreported. This was potentially worrying because recurrent minor glitches do tend to be a warning of a bigger accident waiting to happen, but are rarely recognised as such at the time.

Details of lessons learned and near misses are presented, along with further description of actual disruptions, by theme in the following pages. In keeping with the systems-based perspective of this study, the examples are arranged in accordance with the 4 Level model of a supply chain presented in Section 1 (see Figure 1), considering:

- Products and process controls
- Asset and infrastructure dependencies
- Organisations and inter-organisational networks
- Industries and economies (markets, and the social and natural environment).

The dynamics of such a complex and interlinked system as the UK food and drinks supply chain inevitably mean that these themes are interlinked in numerous ways. Some of the respondents interviewed for this study had already gained a tacit grasp of the systemic nature of the problem, as one Logistic Director noted:

"All business has become more dependent on internal and external links. 15 years ago, if a company lost IT it didn't matter, it would be a local problem and stockholdings were also local. This is symptomatic of an interlinked system, which makes everything more dependent. There is now much greater centralisation of stocks, systems etc. Supply chains are not more brittle, just more centralised and global e.g. widespread product recalls due to the contamination of Chinese honey. Even the bees are less local! The role of the media is a factor too. They are much more interested in big business. Arla Foods lost a third of its share price because they are Danish after the Prophet Mohamed cartoons".

3.2 Product and process control: food safety, quality, and traceability

Food producers and retailers live in constant fear of product safety scares and the associated damage to their brands, reputations and businesses. Not surprisingly, contamination of food and drinks products remained top of mind for many managers as the most obvious 'known weakness'. Throughout the study interviewees from many companies referred to the downfall of the bottled water brand Perrier as a case study of the dire commercial consequences of product contamination. The damage to the Perrier brand in 1990, following the discovery of (arguably harmless) minute traces of benzene in products in the US, was catastrophic. Years after the event the Perrier incident and similar contamination scare haunt the food and drink industry. The possible migration of contaminants from packaging into food was frequently

cited. Consumer terrorism was another well-recognised known weakness. Companies involved in the supply of milk were particularly sensitive to the possibility of malicious contamination.

> *"Our biggest known weakness would be product contamination, it has destroyed more than one brand in our sector, but it is unlikely that the product would get released because of quality controls. It would have to be tampering outside control e.g. on the shelf".*

> *"A major H&S or environmental scare (e.g. a contaminated site) would be catastrophic for the brand. It would be on the front page of every paper. 'Gut feel' is that it could lose 30% of the business, more close to the outbreak. Some customers would never come back. It could do the kind of damage that Nestle suffered over its baby milk scandal".*

> *"A farmer had made a threat/statement that he'd contaminated the milk supply. We had to go through all kinds of checks. At New Year a fork lift truck driver claimed to have contaminated product with glass (hoax). Ring fenced all stock until the authorities had conducted full testing and analysis".*

The issue of contamination of foodstuffs from packaging has already been mentioned, but packagers had their own product contamination problems to think about, though the implications were far less disruptive to the food chain as a whole.

> *"A minor glitch is a contamination problem with raw materials. It is easy to do. There is a very tight tolerance level. Contamination usually occurs before it arrives at the site. Have to flush out that silo and revert to another. It could disrupt for half a day, but doesn't result in loss of supply to market. Worst case scenario is less than a day".*

There were examples of real food scares given, when routine testing had served its purpose and revealed actual dangers to consumers. However, such was the sensitivity surrounding the subject that several interviewees requested that the information should not be presented in this study, for fear that it might somehow be linked back to their organisation or its brands.

> *"It is not about legal compliance it is about perception*".

One wholesale manager did however provide an account of an actual incident where lives were potentially at risk and how his company dealt with it.

> *"Most product recalls are not on safety grounds, but the company did have an incident with positive test for listeria one Christmas Eve with a pate. There were concerns in case the product was abused and served to pregnant women, the immune suppressed or the elderly. The company ordered a full product recall. Around 200-210 sales were recorded in the previous 2 weeks. 20 people were all tasked with phoning 10 customers each. Some customers were grateful to be warned. Others were not, they didn't want the hassle. You can't always get to customers*

and caterers immediately. It can take up to 24 hours to get hold of them. Some people are just not available".

Unlike the other parties in the food industry supply chains, retailers have no responsibility in law to be able to trace products once sold. Concern was expressed by some managers that the Food Standards Agency's own systems would not be able to cope effectively with an event of this kind.

> *"The Foods Standards Agency does issue alerts e.g. aluminium in diced turkey thighs, but they issued an alert on Monday for product with a use-by date that expired on the Saturday before. It only informs people who've registered an interest or have an enforcement role".*

Where a contamination incident affected an ingredient or a whole category (i.e. not disadvantaging any specific brand), managers from all parts of the industry were much more willing to provide actual examples of product related supply chain disruptions.

> *"Product contamination e.g. pesticide issues either specific to us or within a produce category would be an issue. Problems in produce tend to be category specific e.g. black widow spiders in Californian grapes meant we had to do a product recall. The grapes certified as spider-free by US FDA, but spiders were found in produce at several sites. That was a Health & Safety issue, but it was not endangering the business, just an inconvenience".*

> *"We test for toxins very regularly e.g. warfarin in grain from Eastern Europe. Have expertise in contamination testing and are very technically competent".*

> *"We have had instances of Newcastle Disease and Avian Flu in the past, where we have lost a shed of birds. We are susceptible to livestock disease issues and it takes time to recover because of the agricultural cycle. There are all the usual reputation issues around quality and product recall and animal rights activists. We have to be whiter than white on welfare issues".*

The retailers and wholesalers spoke most freely of the widespread disruption to processed food supply chains early in 2005, after tests revealed contamination from the illegal use of Sudan 1, a textile dye, in imported batches of Indian chillies. Sudan 1 affected well over 500 branded and retailer own label product lines. It created the most extensive product recall ever experienced by the retail and wholesale community. Despite the disruption the recall caused, most of those affected agreed that earlier efforts to comply with new traceability regulations had been worthwhile. The retailers learned from the exercise, which had exposed hitherto unknown weaknesses in their own recall procedures and those of the Food Standards Agency (FSA).

> *"An actual disruption was Sudan 1 because it was so widespread. The company only had 23 products affected, most of these were branded not own label. The main issue for the company was traceability. We had*

already complied with new legislations so the systems were in place. Over 200,000 purchasing occasions (in the last 6 months) were recorded for the products affected. After elimination of repeat purchase from the same customers, the company still had a list of over 20,000 individual businesses. The question has to be how quickly could you get to them if it was life threatening? The company formally captures lessons learned and have revised the recall procedure post-Sudan 1 to include getting product off the stock file and managing replenishment systems. There was enough space at the branches to segregate products, enough waste disposal capacity, and plans to remove from shelf…I received queries for some weeks after the withdrawal/recall. The branches had not had proper instructions for disposal and could not just dump it. The risk manual has specific instructions for more usual events e.g. disposal of animal products".

"Good communication is the most important thing. It allows you to minimise the impact of a disruption e.g. with Sudan 1. We are still working with the FSA on that. The FSA didn't have a clear information pathway or single point of contact. We are hoping to see an Incident Scoping Group set up, to scope the extent, scale, key communications and messages. The issue was that we could not get key messages across".

For the food processors Sudan 1 was more serious. Most were content that they had handled the situation well and responded rapidly with alternative sources of supply. Some were still counting the financial cost.

"We got tangled up in Sudan 1 and with the FSA. They managed it very badly. It could have been dealt with differently, but it went in to the Daily Mail and was given a political spin. It involved around 25 SKUs [stock keeping units], that's about 1% across the business, but the noise and energy it created was out of all proportion. It had quite a significant cost impact on us".

However retail and wholesale managers agreed that Sudan 1 created a 'dry run' for a more dangerous scenario i.e. deliberate contamination of the food chain in a politically motivated terrorist attack. A terrorist attack on the food chain resulting in consumer deaths was the scenario that some quality managers privately feared the most, but feeling varied on how quickly existing measures could identify and contain it.

"I'm very surprised that post 9/11 there hasn't been some food chain attack".

"I lay awake at night thinking about that one…Checking for unpredictable contamination is always reactive and the real worry is when the first sign is a death. Testing only tests for things you are looking for. It is possible that some UK food supplies are currently contaminated with any of around 50 illegal dyes, but no one could test at £100 per time for each. Central scientific labs at Leeds had a seminar

discussing testing for '(un)known contaminants' i.e. speculative testing for 'possible' contaminants".

"Quality must always override cost at each time. Milk is a category that is seen as high risk from terrorism. Bovine TB and Foot and Mouth are also a problem with consumer panic. Milk was blamed for Crone's disease, only once, by one study, but that doesn't go away…Milk is the biggest retail footfall product…Every bottle has a unique code with date, site, line and time of fill. If given a bottle it would be immediately possible to establish where and when it was produced. Customers get very upset if milk is not available".

LEARNING LESSONS FROM SUDAN 1

"For recalls a set system is in place. The highest level is a public recall, so that was evoked immediately. We were getting messages through in dribs and drabs all day, so we took the decision to notify everybody once a day, unless there was something really crucial. We made our communications to stores, but once it became clear that there were so many products involved we changed our system slightly. We carried on issuing on that system but we then we issued a spread sheet to stores and to our contacts which said 'as of 1.00 pm today these are the product that are to be recalled. It gave them the full description that appeared on the pack, the bar codes, the dates affected and instructions to what they had to do with the stock. We changed our usual instructions for disposal at store level. We didn't put it in the bin. We arranged regular collections from stores to make sure and issued big red stickers to put on affected product so that nobody could mistake them. We removed that stock and when good stock became available we added another column and then said 'stock with this date is now on sale'.

What it did highlight was that there were products on the way to the stores, that had been picked and left the depot, but hadn't hit the stores. We had told the depot and they had taken everything off the warehouse shelves and taken it aside and disposed of it. We'd told the stores, but it did highlight the potential for problems with stock that was still on the vehicles between the two. I had always presumed that they went in there, picked the stuff in the morning and packed the vehicles and away it went. I didn't realise that the vehicle could have been packed yesterday morning. I did learn something from that.

We've now changed what we say to stores. We told them to continue to check for another 48 hours because that was the maximum time from when ambient products could have been loaded. We send it to the stores and sent instruction to deports, to 'give this sheet to your driver' and when the driver arrives he gives it to the stores.

The customer contacts about Sudan 1 were the highest we'd ever had. I was out of the country for one small section of it. The phones were just blocked. The helpline was blocked with people saying 'is this affected', so everyone here had a list and if people were concerned we did offer them a refund. We had procedure in place but it was a true test and we learned a lot from it. I think we did very well, considering the number of stores and the communications. It really did make us look at procedure and look at setting things up quicker then this, setting up a working party quicker".

3.3 Asset and infrastructure dependencies

This section looks at actual disruptions relating to asset and infrastructure dependencies, including loss of site, loss of people and loss of information and communications technology (IT/ICT). The latter is the area where BCP is perhaps most widely recognised.

3.3.1 Loss of IT and the telecommunications infrastructure

Even the smallest organizations involved in this study, the independent retailers, were mindful of their dependence on IT. They had till software backed up and stand alone tills so that if one till went down the others would continue working. They were also acutely aware of the implications of IT failures for the tills themselves and linked replenishment systems.

All of the larger companies in this study had uninterruptible power supplies (UPS) for IT and remote servers; though UPS were not in themselves fail-safe guarantees against the unexpected.

> *"We have UPS for IT, but it has a tendency not to work when its needed".*

For the larger companies their dependence on IT and global telecommunications was growing all the time. Most seemed acutely aware of the increased dependency and have built resilience into their IT systems and networks. Only two of the companies involved in this study reported having experience relatively recent hardware problems, another two mentioned near miss from viral attacks

> *"We've had an IT disruption only once in the 6 years I've been here. There was some horrible hardware problem. Recovery time was about 2 hours. If a disruption extended from 2hrs to 24-48 hrs then we have a much bigger exposure".*

> *"In France, we had a halon gas fire extinguisher explode and embed itself in the server. It took 72 hours to rebuild".*

> *"We had a near miss with an IT virus that took a day to clear. IT virus is a top risk because of high automation. We have invested in software and are upgrading all the time. Big risks are the ones that are externally induced".*

> "*There was a near miss with an IT virus. Losing the global Facilities Management system would be a disaster. IT crime is also possibility e.g. 'we will send a worm in'. We have emergency procedures for major events, but not isolated short lived disruptions. Sometimes a customer's system can go down, but incidents are thought to be infrequent".*

However, several organisations had experienced disruptions caused by mechanical diggers slicing through telecoms cables. Others were aware that telecommunications lines and routers created single points of failure.

> *"When the cable feeding the main site was cut services were back up in 12-18 hours, but all must be able to maintain operations for up to 72 hrs".*

> *"We have a single point of failure as all the wires come into the building at the same point. The local exchange is another. We were having problems with the data links but are now sorting them out with automatic triangulation. We have separate EDI links via the internet and can pull from elsewhere".*

> *"The phone system is a weakness, we use the same lines for phone and data. There is some resilience in terms of routing. There was an example of a router problem in Manchester. Sometimes we just don't know what would affect us".*

> *"Loss of telecoms would affect the business very quickly, because a lot of data for the organisation goes over the phone lines at some point. Another example would be loss of mobile telecoms across the south of England, all employees are now with 02. The company has satellite phones (one per country) in case of loss of communications".*

3.3.2 New systems implementation/upgrades

The most frequently reported reasons for loss of IT, particularly amongst food processing companies, was teething problems associated with the implementation of new enterprise management systems, such as SAP. Encouragingly, organisations were aware of the potential vulnerabilities such systems introduced. There was also evidence to suggest that, on the whole, organisations were getting better at contingency planning for the introduction of new systems and other IT upgrades. Nevertheless reports of smooth IT implementation were rare enough to be remarkable.

> *"We are totally reliant on telecommunications for call centre operations, and we are totally reliant on SAP for data provision and business process workflow, using IT systems based at a site in Continental Europe. There has been a change in attitude at main board level because of this. They understand that SAP is the central nervous system for the business. 80% of global business will be on the SAP system by the end of 2007. Three centres, one each in Europe, Asia-Pacific and the Americas provide computing power. It is a great idea in terms of economies. It will simplify the business and result in billions in savings. Now that SAP is in place the systems are guaranteed to come back up within 72 hours. This is being tested over a weekend in November (2005) by closing down the main service centre and migrating to one in another location, then back again before Monday. It is a fantastic system, but if it should fail it would take many countries' operations down together".*

"Had lots of headaches putting SAP in during the mid-1990s. We were one of the first to implement the whole suite. We allowed plenty of time for training and went for incremental implementation. We built stock in advance. Sales went first and the interface between the new and old systems didn't work in the beginning. Lots of lessons were learned and upgrades have gone more smoothly. It challenged the way we do business. Upgrades result in only small hiccups, but the initial implementation was a big problem. Operations kept running, but needed lots of manual intervention".

"If an event is occurring in a supplier's business there is everyday dialogue. When Cadbury's installed SAP, we built 3 weeks stock and got credit".

"BCP is part of the company's SAP implementation process".

"We went live with SAP in March. It went well. We won a prize from a high street customer, 'The Mould Breaking Award', for being the first suppliers to implement SAP without disruption to service. We had a very good project plan and experienced people from the US to manage implementation. We didn't use consultants, the internal people remain available to us".

More than one manager pointed to the pitfalls of complacency and underlined that when it came to new system implementation, even the most adept still get it wrong sometimes. The danger highlighted here was to underestimate the amount of work involved and assume that an implementation will go smoothly, because the last one did.

"We had problems with implementing traceability systems. We left it too late and didn't have the right team in place. Unlike SAP implementation, we didn't understand the requirements or what was going on properly. We learned a lot from this. i.e. don't just send people in to do something, give them plenty of time. It was awful for the first 6 months. We didn't apply some of the lessons learned from SAP and couldn't build to stock for this one. We underestimated the challenge. SAP implementation was dedicated staff, 'experts' from within the business. For traceability we expected people to do it as well as their day jobs".

"I'd advise that realistic timetables and realistic plans for events like these are essential, especially if staff are expected to manage this on top of their usual duties. I'd recommend parallel running of the systems for some time".

The increased IT systems dependency within warehouses was also a recognised source of vulnerability, both in term of susceptibility to power outages and systems upgrades. One of the companies had learned the hard way about automated warehouse systems.

> *"At the moment we are using sticking labels and paper systems in the depot, generally that gives a couple of hours work, so you can have computer failure for an hour or so and it might not affect you at all. There's a new system going in that will be paperless and then you have an immediate impact. If your system stops, the computer system stops in mid-track. You don't know what the next case to pick is until the computers tell you. When I've worn my business continuity hat, I've whispered and shouted in people's ears saying do you understand the difference in this. We have to allow for this, you have to have the appropriate system back-up for this if it fails, hopefully when we move in with the new system that will happen. Some of our competitors must be in this position already. You are doing, in effect real time picking. With an automatic director system, you don't have any time. When you system stops you stop work straight away".*

> *"All warehouses are fully automated. In 1996/7 the company's first fully automated warehouse went live. Soon afterwards details of all 10,000 pallet spaces were lost. No back-up existed so the warehouse had to revert to manual checks on every bay and re-key in. It has never happened since".*

3.3.3 Denial of access/loss of site

Denial of access/loss of site was something that all of the large organisations had considered. The centralisation of Head Office 'mission critical activities' in fewer, more geographically distant sites made Head Offices potentially single points of failure, hence the effort put into displacement planning activities. They also made them potentially more tempting targets for those with malicious intent.

> *"Most critical service departments are being relocated to a single site. We are now looking at increased security. It is poor at the moment and has led to problems with thefts. Swipe cards stopped most of that. A lap-top with all the details of new business had been stolen. There has also been an incident with an armed intruder. There are duty of care issues, but most of the problems have been linked to protesters/activists and potential loss of commercial secrets such as recipes or hacking".*

In practice, few of the companies had suffered from security-related disruptions. One retailer had been denied access to its Head Offices after an IRA bomb exploded. Another organisation experienced disruption to its Head Office on the day of the 7/7 London bombing.

> *"Here in the UK the 7/7 terrorist attacks did disrupt general work. Most people were in West London and had to manage car sharing".*

Only one food processing company indicated that politically motivated terrorism had been a direct influence on its attitude towards business continuity. Again this was linked to its London location and disruptions to site access from IRA bombings. Managers from the company concerned pointed out that there are now very few large food processing concerns left in and around London. Most have migrated northwards or moved operations overseas. Of course some companies did have to deliver produce to stores. One company had had deliveries to customers affected by bombings.

> *"The 7/7 bombing resulted in problems e.g. van parked behind the bus at Russell Square. 2 or 3 drivers were within the restricted zone and they had problems in getting product in if shops were open. Then there were questions with unions whether drivers would go into Central London because of safety fears. London just closed itself down".*

Bombings (real and scares) were a problem for city centre retailers, but protests, fire and flood were also common concerns for the retail and wholesale community. Retailers and wholesale companies regularly lost individual sites to fire, whilst this was disruptive to the sites concerned, events of this kind were unlikely to threaten the well-being of the business or significantly disrupt service to customers.

> *"The company has experienced a temporary loss of a branch (8 months) due to fire and a couple of major floods stopped operations at other location. The recent flash floods in Yorkshire put out power supplies to 2 branches. Storms and heavy snowfall would be more widespread, but would only affect a proportion of the branches".*

The possible denial of access or loss of retail distribution centres (DCs) was a much more serious matter. There were also examples of DCs with single access roads or of accidents causing short-term disruptions to a large proportion of the network.

> *"A fatality of a third-party lorry driver almost stopped the operation of one of our two central distribution depots. The Police cordoned the area off and stopped all vehicle movements on and off the site. Intervention by the Supply Chain Director, with the local Police Senior Officer avoided major disruption (and traffic congestion on surrounding roads)".*

DCs are critical nodes in the retail networks. Their vulnerability is recognised by retailers, manufactures and protesters. Farmers featured prominently in this context. Their protests were mentioned by all of the major retailers and wholesalers, and by companies in three other tiers of the milk supply chain.

> *"We were once picketed by the NFU. Now we have very good relations with them and we are keeping it that way! The company has 3 RDCs to spread the risk and can redirect deliveries in and out of the other two if one is affected. Some direct supply arrangements are also in place".*

> *"We had some blockades when the farmers were objecting about the price of milk. But they don't know the right time to blockade the depot, so they were actually doing it when it didn't matter too much, and you*

can move distribution to somewhere else. It's only going to be a one day or two day hit. That's not going to take us out completely".

"There are perennial problems with police closing off sites due to bomb threats and farmers' blockades. Different police forces react differently to issues of farmers, some see it as secondary picketing. The forces that see it that way do remove the obstructions. There was a lot of farmer activity before Christmas".

"There is a possible threat from farmers withholding milk, there was some of this in 2005/6, had spots of this in the UK over unhappiness with the milk price at farms. If the farms withheld milk for 2 days you would see an impact on the shelves. It would be front page news. It is not likely to happen because the farmers can't afford it. If 40-60% withheld it would be a big problem, but the industry would get together to conserve supply of fresh and communicate very closely with customers. We had plans in place for when Farmers for Action blockaded depots. Some milk was lost but not enough for a major disruption. The scale was not as bad as it might have been".

"Farmers for Action have protested at diaries. That would be an issue for non-in-plant sites" [i.e. dairies without on-site packaging plants].

Site contaminations were rare, but one retail logistics service provider had experienced a 'near miss'. Quarantine for livestock diseases was also a known weakness.

"We did have one significant crisis and I was totally lost when I got the news. I received a phone call from the environmental health in the warehouse. They were planning to close it down because of possible asbestos hazard in the roof – which could have required every pallet to be removed, hoovered and the whole building hoovered and then tested again. The location was not in mainland Great Britain. There were no alternative facilities available anywhere else in the area. It was an impossible situation, but the customer dealt with the environmental health office and agreed to a closure for 2 days testing. It was found to be clear".

"Anything that stops people getting to work, such as an event near a site involving quarantine would leave the facility landlocked".

3.3.4 Reduced retail distribution capacity/sites

The consolidation of retail distribution networks, as a cost saving/efficiency measure was highlighted by some of the retailers and wholesale company managers as having the potential to increase the impact of a major event.

"We are having a major re-organisation of the distribution network at the moment. We've just opened a much larger national distribution centre (NDC). This now does a significant part of our business, and we only have one, so we now have a single point of failure for 20% of our

ambient throughput. We have addressed that in 2 ways. I've been pushing all along to make sure that they have protected the site adequately. We have spent a fortune putting sprinklers in. To us a fire is the only thing that can really throw operations completely. We also have a plan that if we lose the NDC the lines would be displaced to one of the other DC in the network, and its lines would be absorbed throughout the network. At the moment we still have redundant capacity in buildings, but not people and equipment. In 5-6 years time we should have composite warehouses instead of the separate ambient and chill sites we have now. The plan would be the same…hopefully! I keep shouting at them 'when you are planning the size of the 6, you have it such that 5 can do the work. We are working on the fundamental premise that we are not likely to loose more than one depot at a time. The risk of loosing two depots at the same time is so small as to be ignorable"

"The network structure means the company could switch stores across [area] boundaries. It could cope on a survival basis for 2-3 weeks. We have 5 weeks sale cover in branch and the range is large enough to allow for basic commodity substitution... Some DC have been sold, so the company is down to 3 RDCs and an NDC (now the bonded booze store). There are no plans to reduce the network further just now. The original intention was that everything should go through the DCs, but have now gone back to direct to branch for fast moving lines".

The outsourced logistics service suppliers, the 3PLs, were more upbeat about the removal of redundancy from retail distribution networks.

"We have loss of site plans etc. but don't have spare sites/warehouses because they would cost a fortune…Deciding not to plan for something is not a debate we have had. It is defeatist. There is always something you can do, something is better than nothing. This industry is very tolerant to change and is good at being reactive. Some of the best creativity comes out of panic possibly opening up new ways to gain competitive advantage. Sometimes it is about the 'art of the possible' – i.e. what customers will pay for".

Capacity issues were also raised in relation to specialist chilled distribution. Indications from one of the industry associations suggest there is still a significant amount of old cold storage capacity available in the UK. Though industry watchers observed that for reasons unknown the amount of spare capacity was unusually low in Spring/Summer 2006. However, predictions are that much of the existing capacity will have gone by 2015, when new regulations affecting refrigerant requirements banning Ozone Depleting Substances (OSDs) come into force. There is a possibility that companies will be unwilling to invest in upgrading very old facilities. The current shortage of cold store capacity was also highlighted by a manager from a food company in June 2006.

"You wouldn't think it would be a problem to find distribution centre space. We are having a facility built, but it is not going to be ready for a while. Recently we wanted an extra 1000 pallets of cold storage. We

tried phoning round but it wasn't there, you wouldn't think it would be a problem, but we have had to adjust our plans and timing until our own facility is ready".

3.3.5 Clustering of distribution centres

DISTRIBUTION CENTRE LOCATION, LOCATION, LOCATION

"We have a new National Distribution Centre (NDC). I'm not particularly happy with where the site is, because it is in quite a large industrial estate and it's got one access road and we are at the end. A competitor's warehouse is next to us and there's another big competitor's warehouse on there too. Similarly, the site itself, our biggest site, only has one access point, but we are in the process of modifying our plan for that.

The DCs are clustering down south as well. From what I can gather, you are never far away from someone else. They are all chasing the subsidies on the site and using the same consultants. Down at Thurrock, along the M25 you've got the biggest retailers not too far away. They'll be doing exactly the same sort of thing as we would. Their contingency plans will all be the same as ours. We know by chatting to consultants working here at the moment on our network reorganisation project. Look at their backgrounds. One has worked at Tesco, one has worked at Sainsbury's and one had worked at Safeway. These are logistics consultants and they have been in that part of the business, and that's where we derived our NDC plan from, because that's what they do as well. They haven't got a spare warehouse sat empty, and they do have single points of failure as well. Having said that, if we can all cover the rest of our networks from other sites, then it doesn't matter.

The ideal scenario, would be if we could all get ourselves together in a big huddle and have a spare warehouse, or 3 spare warehouses that we all jointly owned. When I was more active in this I would go to Survive meetings in London, we started this discussion a little but, over a couple of years it was always a terrorist threat in London that was more of an issue. Everything was terrorism related. We are extremely unlikely to have a terrorism related-incident. We are more likely to have a blockade by farmers, which we do have from time to time, or a fire.

The thing that is likely to affect a food distribution depot is fire, I think the statistical average is something like, for us, we should have a fire about once every 8 years, and we have had a fire about once every 8 years, within the Group. The one 16 years ago was in a facility that disappeared completely, this was before anybody thought about business continuity. The second time we had a fire (at a different site), it was very small so it was contained by the sprinklers. We had smoke damage and the depot was down for a couple of days but apart from that it was recoverable".

Those involved with grocery distribution were keen to point out the existence of a 'Golden Triangle' for distribution stretching from M25 to Bristol and northwards to

Lutterworth and Nottingham. Within the triangle is a clustering of distribution sites close to central nodes in the motorway system. There were others clusters close to the big conurbations in the central belt of Scotland. One retailer confirmed that distribution centres on these sites feed stores within a 150 miles radius. In some instances national distribution centres (NDCs) supplied ambient products across the entire length and breadth of the UK.

3.3.6 Floods and factory fires

> *"Be mindful of geography and don't put key sites/activities in places that are susceptible to disruptive events…We did"*

Like the retailers, the food processors were aware that they were vulnerable to flood and fire, and focused factories (i.e. the practice of concentrating national/international production of one or more product lines in a large single site) increased their impact.

> *"Major floods are our biggest danger. We are taking on the lessons learned. Most of the East Anglia sites are on the same flood plain. Head Office is on a flood plain, with flooding every 8 years and we have multiple distribution locations and 10 factory sites which are focussed factories which could not switch to other lines. It is something to think about, the extent to which you can look at your products and the ability to switch manufacturing locations. Should have product strategies not just site strategies and alternative suppliers and the ability to switch in an emergency".*

The biggest multinationals with operations around the globe were most likely to have encountered extreme weather. Several had been affected by flooding in Prague

> *"The Czechs watched the flood waters rising. The servers were in the basement, these were eventually disconnected and carried up the stairs to higher floors. This taught the company to be mindful of geographic locations and likely disruptive events".*

> *"During the Prague flooding, the server was rescued by inflatable boat. We had to run for 1 and a half weeks on mobile phones only".*

One of the managers had advice for others in similar circumstances:

> *"To reduce likely structural damage to buildings from basement flooding, fill the basement with clean water. This helps to keep contaminated water out and helps equalise the pressure internally and externally".*

Fires in food factories were very common. Those that had experienced them also appeared to have learned from the episodes.

> *"Food factorise are inherently dangerous and likely to catch fire due to their design and activities. There was a big fire in the 1980s. The company was up and running, and processing within a week. This*

company loves a good crisis!... We have a contingency zone on site now in case of a possible burn-down. It used to be 8-10 months rebuild time, now we could bring a contingent site line back up to date after around 2 weeks."

"Had a fire which burned down a facility. The fire was handled well at first but recovery was not as good as hoped, hence site-based continuity plans".

"Had a blow moulder that caused a small localised fire".

"One of our joint venture partners tends to lose factories/offices to fires, so we are looking at home working and displacement contingencies to reduce the impact of fire resulting in partial or total loss of a site".

"We had overheating at a site in the Northwest but the emergency services made more of it than it was. It drew attention to the risk and we are likely to receive greater support for fire detection, management and fire precautions infrastructure. It would take longer to replace a site/capacity".

3.3.7 Neighbours

The fire at the Buncefield oil depot in December 2005 had raised concerns about neighbouring facilities and possible loss of site. Some companies had already recognised that accidents in neighbouring sites could spell problems. For one company Buncefield also raised the dilemma regarding customers' requirements for agility and redundancy and it's own 'lean' strategy.

"Preparing for accidents has led to changes in our approaches e.g. auditing neighbours. There is a hormone factory next door, another neighbour has chlorine which might result in a reverse evacuation. We have another site near a lead mill and have changed airport flight paths".

"A known weakness is that we have a diary and depot next to an oil depot, which could result in loss of access or loss of site".

"Near misses have been for example when a CD factory caught fire near to our distribution centre so couldn't have transport in and out for half a day. Had the smoke penetrated we would have had to test the stock and possibly discard it. We had a factory in France disrupted when a nearby factory exploded and stopped operations for a while. In the UK had a bottling plant just closed because of fears of chemical pollution from Buncefield. There were concerns for the aquifer, fears that chemicals might have got into the ground water. Any contaminant would destroy the business".

"One of our biggest global customers was affected by Buncefield. One of its 2 UK distribution depots was next door to Buncefield. It wiped out

50% of their UK stock and 50% of their distribution network. They had to launch a crisis management plan and they did very well at first, but then things started to groan. They are now involving suppliers in BCM. They are asking us to prepare plans for 2 days. They are asking for testing as well as plans. We have to be able to demonstrate an ability to switch supply between sites. This is creating a bit of a problem for us as we are in the process of executing a global plan to remove excess capacity. We are going to single sites by production technology. At the moment we can produce some of our lines at 2 sites in the UK, but that redundancy is being removed. We are closing one UK site and 2 DCs. The stock holdings for all of those sites have been consolidated and reduced".

3.3.8 Production site consolidation/capacity reduction

The ability to 'flex' production between sites in the event of a disruption to either a site or product line was the principal, and sometimes only, contingency for the vast majority of processing and packaging companies. Unfortunately, this redundant capacity was being eroded by growth or their strategic choices which several identified as a 'known weakness'.

"We have no plan for loss of site. If we lose a site we could put another packaging site in 6-9 months, depending on which site. We have some spare capacity if there was a problem, not a lot of spare capacity, about 15%. Head Office is more critical...A competitor's factory burned down and we were able to supply the customer instead. There was more spare capacity then. We have closed down a site but spread capacity to other sites. Reduced total of that site's capacity by around 40%. Asset utilisation now at around 80%".

"Moving production between sites is a usual part of the balancing activities. The company produces a high proportion of the bread bags used in the UK. There are between 800-100 million sliced/wrapped bread loaves produced in the UK per week. 2 or 3 companies supply most of that market. We have a number of packaging plants in the UK. 2 of the plants work flat out to provide bread wrappers for the two or three biggest bakeries. We lost one production site recently, but were able to cover from finished stock".

"We plan for the possibility of losing a production site for a given time period and look at each site being able to back others up. We can easily switch production to another line or site short term without disruption to supply. We don't plan for the loss a production site for a very long period i.e. if we lost a factory. We don't have redundant capacity. We used to have it but the company's growth has used it all up. A new facility is being built but there is always margin driven pressure to optimise production capacity. The only definite redundant capacity for 49 weeks per year is for a seasonal product. Ultimate capacity utilisation is Christmas. We accept that machines sit idle for this. It is the only example of it in the company".

"This company has just bought a flour mill and closed 3 smaller ones. The trends are slimming the industry down (to alter the relationships with the retailers) also going for further diversification, which is good for consumers, but not for volume production".

"The company has substituted for competitors in the past (supplying to hospitals). The limiting factor would be capacity. Company has around 5% excess capacity in Ireland, and is outsourcing some manufacturing to others. There is no spare capacity outside Europe. Some European third party companies have more capacity and would help to supply the market if required".

"We still have some redundancy and internal activity switching options in place, but this will not be supported with on-going investment so will degrade. We are investing in other alternatives like out-sourced production e.g. Hungary. That might mean a lag of several days if a product line was lost".

"*Our factories run 24/7 at 85% + utilisation. We only shut down at Easter and Christmas, but even then our sites are still not big enough to be economic! Each line runs 12 days from 14 with 2 days shutdown for maintenance and cleaning. It's the only way to compete with Poland. We have to have high asset utilisation so we are following a policy of site reduction, few bigger systems, more tightly optimised. One of the 3 sites has been a back-up facility for the others. One does not have sprinklers. We are now closing a factory and relocating the products. It is being forced by space constraints, one of the sites cannot cope with the capacity as company goes to centralised factories. We are going to 2 sites with no redundant capacity in the UK. The same product range could be sourced from Eastern European sites. Distribution centres for UK factories will be remote, but we are not taking the factories and DCs out together".*

Only one company involved in this study was deliberately investing in redundant capacity. It had previously suffered a serious disruption to operations resulting in reduced service to customers. The company operated in a low-margin business but one that its well-resourced parent company felt was worthy of long-term investment.

"We have 4 key volume lines. We lost an SKU at one site for 2 months, caused by replacing a blower (needed for packaging). We couldn't make that size. We are putting in redundant capacity to avoid that again. Had 100% utilisation and packing was the constraint. We have a multi-million pound investment programme to increase plant capacity and improve maintenance regimes and more careful stock planning for the project. Will have around 50% capacity spare, some of this will be taken up in time, but we will not go so lean again".

3.4 Loss of people

3.4.1 Institutional memory

When companies are making provision to keep Mission Critical Activities running, one problem they may encounter is that although the MCA may be readily identifiable, the critical knowledge workers are not always so easy to pin-point. In some instances organisations did not recognise where the essential knowledge was until after it is lost.

> *"Organisations should know who the essential knowledge workers are, who is it that has the specific local knowledge that is essential to the business?".*

It is worth noting here that the companies least likely to have formal reporting structures for lessons learned and near misses included some which provided some of the most politically sensitive key categories. The companies concerned tended to rely instead on institutional memory. These organisations tended to be UK-only operations, mostly with strong residual 'family business' cultures. They also tended to have unusually low staff turnovers within the management teams, which could, in a post-floatation scenario, be lost in the event of a take-over or merger.

> *"This company is very heavily dependent on the knowledge of long-serving employees. The thing that would concern me most is if half of those people weren't here. This company has a very long-serving employee base. There is a huge level of tacit knowledge within the company".*

3.4.2 Consultants – the pros and cons

Consultants can be a boon to overworked managers, particularly in areas where specialist expertise is scarce. They can offer a short-term 'quick-fix' (e.g. in the preparation of first draft business continuity plans) but the same problems of long-term development and retention of expertise may remain.

> *"Consultants can be helpful in drawing up plans, but then there is a problem about keeping them up-to-date".*

Some companies look to establish their own in-company capability in key area by placing their best and brightest to work alongside the consultants. The advice of one manager interviewed for this study was *never* put all of your best people into projects of this kind.

> *"Ours was the largest and one of the earliest SAP implementations in the UK (in terms of all modules). We did business re-engineering at the same time as implementation. That raised a continuity issue. We put fast-track employees to work on this alongside SAP consultants. We had a 75% attrition rate. We had a 'No poaching' deal in place but could not enforce it. We would expect a 30-40% loss of staff, but now have a*

process in place to identify promising employees and manage the skills set as well as possible."

3.4.3 Industrial action

Incidences of industrial action amongst food workers in the UK appeared to be rare. Two of the companies had experiences problems with industrial relations, but had contingencies in place to cover for further disputes. Industrial action at retail distribution sites was judged to be a more likely event, but 3PLs and agency staff are used by the companies concerned to mitigate the threat.

"Had some industrial relations problems 5 years ago but was well managed and production increased. It was a productive exercise in that non-factory staff temporarily moved into other roles".

"The company makes provision for strikes and negotiates wage rounds each year. It has contingencies in place for management staffing".

"Within the DCs, industrial action is a potential threat…One of the DCs is run by a third party, which may help with resilience against industrial disputes. Process control is easier with contractors. It is easier to prescribe and to discipline 3rd parties than errant internals".

"It does not take a lot to grind operations to a halt e.g. with union activity at a depot. It didn't take much of an issue to throw a stick in a logistics operation".

"*A problem within the distribution network could disrupt operations. There were issues a while ago with our own staff in distribution. Three quarters of distribution is in-house at over 30 sites in the UK. The company is balancing its profile with 3PLs to in-house. It was 40% 3PL 5 years ago, but views have changed and two large sites have recently come back in-house due to poor performance".*

"*A national strike by the TGWU might be a problem, but union membership is patchy. Only 50-60% of staff are union members. There have been no strikes in food services over the past few years. Most drivers are not unionised and there are lots of agency staff available. In fact at one depot all drivers are agency staff. The company prefers to use its own drivers because it means they have more rigorous Health and Safety training. Worst case scenario would be a major strike by tanker drivers. They are highly unionised and militant".*

3.4.4 Shortages of skilled staff in transport and logistics

Labour shortages affecting both skilled and unskilled workers were highlighted by a number of companies, particularly in the South of England. Some pointed out that the loss of a good DC manager at a crucial time would seriously disrupt operations. Elsewhere e.g. in bakeries, the tacit knowledge of how the sector works is concentrated in very few managers.

> *"Staff turnover is an area where we are vulnerable. Hanging on to really good experienced logistics staff is difficult, particularly in the Thames Valley. We have a high turn over in the commercial teams too".*

> *"Driver shortages is an issue we have had, so now we have a training course for warehouse staff to become HGV drivers. It is becoming common in the industry. The company first did this 4 years ago, but the programme was abandoned due to costs, but then restarted because of the threat from the working time directive".*

> "*Managers' knowledge of how you run the industry is in the heads of a very few people. Loss of key managers would be very damaging, worse than the loss of 200 drivers".*

> *"We are skills and technology and IT dependent – so not having a trained workforce available could disrupt operations. Leaner means it takes longer to train new people".*

DAILY BREAD? NOT WITHOUT SKILLED WORKERS

"A new facility was a shambles for the first 6 months until new staff were up to speed. We maintained 90%+ service, but the retailers wanted 99%. English is often not the first language of the workers, so it is necessary to use colour coding on packaging. This creates problems getting people up to speed on Health & Safety. The company has more than a dozen bakeries in the UK, including Northern Ireland. It employs 6000 people, 2,500 in distribution (50% drivers and 50% warehouse) and 3500 in manufacturing and hygiene. It makes 10,000 deliveries every morning. All are delivered direct to store. It involves a fleet of 1000 vehicles, which is as big as Tesco's fleet. It carries no inventory of finished goods, which means it is difficult to ride out 'storms' e.g. a strike. If even one factory or warehouse is off-line then there is a problem. The bigger the event the bigger the problem. We can cope with 8% absenteeism, and can get 5% from agencies. The company can find, train and accommodate only up to 5%, meaning that there is no easy ready source of reserve labour (all employees need training). For a dispersed problem there would be massive difficulties in finding staff".

3.4.5 Market-based contingencies: agency staff and migrant workers

Some of the companies had turned to market based solutions to meet their labour requirements, particularly in sectors where demand for labour is seasonal. In the transport, distribution and agricultural/fresh produce sectors migrant workers and agency staff are a main source of labour. One company had found it so difficult to recruit workers locally that it had set up its own recruitment agency in another EU country to solve its labour shortage.

> *"We have set up a unit with an office overseas to recruit new staff only for this business. We don't get into gang master issues etc. Labour shortage was a big risk to the business, partly because of its rural location which means there are not big labour pools. Some work is routine but there are skills issues too. e.g. butchering".*

> *"The company has never had a fire or bomb, but sites do have visits from time to time from the immigration authorities to check for illegal workers recruited via agencies. A lot of the workforce in the warehouses are now Eastern Europeans. There are mass recruitments from Eastern Europe, often recruiting educated people who work in the UK and send money home to the family".*

> *"The numbers are growing and it depends on the part of the country. Five or six members have Hungarians and Poles, mostly as drivers".*

> *"The company takes on a huge amount of agency workers at Christmas. Some contracts more than double in terms of picking. We even move some staff between sites".*

> *"The company uses a lot of agency labour, if we are unable to provide it e.g. HGV drivers. Some sites are dependent on agency staff, others are not. There are regional differences in staff loyalty, but they are quite a loyal workforce, who take personal pride in the company".*

3.5 Failure of the transport infrastructure

Transport failures tended to be viewed first and foremost in terms of the impact of the fuel protests in September 2000. However, when it came to actual disruptions and known weakness, other transportation systems failures were certainly present. There were concerns that warehouse staff often used public transport to get to work, which could be unreliable in bad weather. Simple traffic congestion did cause significant problems for manufactures and retailers alike.

> *"We have a problem with one of our sites if the M25 closes. It closes several times a year for up to 3 hours and it clogs up all the roads around causing problems with supply".*

> *"Most risks for the company are around the RDC [regional distribution centre]. It is near the A1M. Closure of a small section of road could affect access considerably. It is the biggest volume DC. The road*

configuration does make it vulnerable. The rationale for its location was the availability of land and it was perceived that labour was less of an issue at that site then other sites available".

"We have a logistics review underway. One of the biggest problems is the roads in the UK. They are too congested and too unreliable. All the company's goods are moved by road transport. We have quite a lot of dispersed stock and need to move that around a lot. It's an inefficient network".

In a Just-in-Time (JIT) production environment a disruption to traffic of only a few hours can have an immediate effect.

"We would run out of raw material, meat first. Birds are killed on a JIT basis. If there is a delay of more than 20 minutes at the killing plant it will have an effect somewhere in the production at factories. There are also animal welfare issues. Birds must not be on lorries for more than 2 hours because they become distressed. Lorries have passive ventilation so if the vehicles are not moving the air is inadequate. Welfare issue are important. If there is any problem there is a huge inquest within the company and rightly so".

"Rolling blockades are more of a problem, so are major road closures and roads being closed after accidents. It's a problem for JIT supply chains. For the retailers we deliver on day 1 for day 3. For Manufacturers we deliver on day 1 and it is used by the end of day 2. Weather is a problem when it closes the roads e.g. the M1 and M11 a few years ago. The Scots manage to keep roads open – why not in England? The new agency is not helping to keep arterial routes open. We are 20,000 drivers short in the UK. Policy makers don't encourage people to go into the business. People are prosecuted by the DVLA, there are costs and driver shortages and government policy on fuel is tax-driven".

Producers and processors who had moved production overseas, or who imported produce from foreign shores, remained fearful of disruptions to their UK distribution activities and mindful of their dependence on the *international* infrastructure. They were acutely aware of their vulnerability to anything that might place restrictions on the movement of goods between countries, particularly disease or other natural hazards.

"The obvious one is lack of raw sugar, we use 100% raw cane sugar. We are 100% dependent on imported raw materials. We couldn't go to sugar beet. Beet processing can go to cane easier, but not the other way round".

"We buy fish products and lamb from New Zealand and the Arctic or Chile, which comes in by sea. Something like the closure of the Suez Canal could put lead time in. There have been problems recently with deep sea freight capacity. The Chinese took a lot of Panamax ships which disrupted supply of soya out of Brazil. There are usually queues

of ships at harvest waiting to go. 2 years ago there were no ships. They have built more ships now, but there is also a problem with containers, the flow is one-way. There is an import-export imbalance".

"The company has good relationships with the agricultural community and Irish suppliers. It is a big industry in Ireland…Post-Foot and Mouth the company had problems moving stock from the Republic of Ireland to Northern Ireland. It had all the veterinary certificates in place. It had the border opened North/South and the US embassy arranged for a waiver to be put in (via the trade association) for sealed units of product for transatlantic flights".

"Weaknesses include strikes at [overseas] plants and blockades - any blockade of the channel, not just the tunnel, and disruptions to fuel or loss of power to the UKHQ and distribution centres. Delivery is 100% road transport. We have 2 distribution centres in the UK, 2 in France, 1 in Belgium. We could divert the flow to another DC. There are no back-ups to DCs and no duplicate facilities".

"Known weaknesses are fire and flood at the DC and pandemic flu. Because our product comes from overseas there are also concerns about docks strikes. That is potentially a weak transport link".

GLOBAL SOURCING AND SUPPLY: TRANSPORTATION DEPENDENCIES

"In the short term, the failure of service suppliers for IT, or our major customer's haulage contractor, would affect us. The failure of our clearance agents would be a big problem. They do all the paperwork to clear all goods into the country.

If the shipping line stopped that would be devastating. Utilities and ports are the others possibilities, but we could divert from one port to another.

For produce suppliers we could switch to a different location/product... Local produce supply is very local supply e.g. broccoli near Spalding. Fresh produce is a very seasonal business that switches between Northern and Southern hemispheres for winter/summer. Each season, we review the stability of the chain and look at 'What if Scenarios'. E.g. this season there is an issue with one shipping line having almost 100% of the South African produce supply business. We are a dedicated supplier for one major customer and all the produce from SA for a whole week was on one ship.

We have had 3 incidents this year, with breakdowns and delays, which is unusual, but we are reviewing for next season. We do capture lessons learned. e.g. strikes at ports, or sea freight or distribution strikes. A sea freight disruption would be the biggest risk, not getting the stuff to the UK, or being unable to release if from port e.g. because of a suspected terrorist event affecting a supplier or fuel strikes. Produce is trucked in from the ports or from the continent by road. We are heavily dependent on road transport".

3.6 Organisations and inter-organisational networks

3.6.1 Disruptions to supply: the retail perspective

Just as the large retailers and wholesalers had been in the happy position of being able to withstand the loss of any one store without serious damage to the business, no single supplier of foodstuff was critical to the business. At first glance only the loss of utilities or telecoms suppliers posed a real threat to operations. On closer inspection, there was a potential problem with the failure of another service supplier – waste management.

> *"No one product supplier failure would affect us, only loss of utilities. There are times when a product is not available, or e.g. a flooded supplier in Carlisle leaving key product lines out of stock - an example of a manufacturer's focused factory under water, and no alternative facility. We were supplied on a 'best endeavour' agreement, but there may be arguments over who gets the first load".*

> *"Nothing that would stop us, other than electric/utilities. Not having some major products would be an issue e.g. we have one supplier of ready meals. We have tried to consolidate more and more, but are now rowing back from it slightly, not publicly, but we do recognise the risks as well as the commercial benefits".*

> *"In terms of waste disposal, the company has a massive contract with one company. There are separate waste systems e.g. for meat, hazardous pharmaceutical products, etc. If we lost the waste contractors to store that would become a problem quite quickly".*

> *"Waste management was flagged up by this study…Our business is like a pipeline, if you block it up at our distribution sites, for example, the operation would come under pressure in about 36 hours… it's a space and environmental issue. If we could not remove waste from site, the build up would squeeze the operational space and degrade performance beyond acceptable levels…Waste management is transport dependent and therefore fuel dependent. That is closely linked to fuel planning and government".*

3.6.2 Suppliers: the first line of defence for retailers

For the most part retailers (i.e. those immediately next to the consumer) see their suppliers as the first option for contingency planning and under normal circumstances the suppliers did what they could to oblige.

The three independent retailers who participated in this study (one sole trader, one facia group and one small multiple) all had regular supply agreements with local wholesalers, who supplied them with all categories, with the possible exception of fresh produce. The independents had no dedicated supply chain management specialists, and relied totally on their respective wholesalers to ensure product availability.

"It tends to be about personal relationships and all parties try hard to keep people happy, the sector doesn't rely on contractual terms, it's about goodwill".

"When one wholesaler failed whilst changing warehouses and went down to 60% fulfilment, the contingency plan was activated. I went to the local cash and carry instead".

"Wholesalers do help out in an emergency. The whole sector is very dependent on good relationships with the supply chain and authorities e.g. for alcohol sales. Relationships with Local Authorities are more adversarial and subject to changing social attitudes".

The wholesalers confirmed their support for customers and in some instances provided assistance to their suppliers as well.

"We would bend over backwards to support our customers if they had operational failures, e.g. replacement next day of broken down freezers".

"We do backhaul from suppliers and have been able to collect from suppliers if they have had a problem".

Similarly, the large food processing companies and importers routinely stepped in to assist the big grocery multiples and branded high street chains, though relationships between the largest retailers and their suppliers were rarely as amicable as between the smaller retailers and their suppliers. Interviewees offered numerous examples. Some of the companies' loyalties were split between the retail clients and large public service institutions.

"Retailers are very aggressive, they dictate all kind of business terms – it is how they operate. e.g. retailer wants to specify who the company uses for seasonal storage and now want to choose the 3PL involved to help optimise the retailers transport fleet. Terms are dictated not negotiated, it's a partnership obsession".

"We are a dedicated supplier to one customer. They say 'jump' and we say 'how high?' e.g. if the customer has industrial relations problems we would do what was necessary to get round that e.g. hire loads of vans to deliver to store instead. We are commercially obliged to do it. Open book agreement means wouldn't suffer major financial consequences, but the customers are traders by nature so open book dedicated supply is counter culture".

"Have helped many by moving stock to different locations if they are having a problem with a facility or relocation and have provided physical resources – people to go into stores when they are short staffed e.g. Christmas".

"Have supported customers, e.g. 2 weeks ago the largest wet tinned pet food company burned down, it supplied the big retailers' own label. They asked us to cover 12 SKUs".

"We have some sensitive customers e.g. prisons, also used to be holiday camps and dairies. 'Sensitive' means they shout the loudest if they don't get their orders. Plus we have one of the smaller supermarket groups, we are their sole suppliers and have a duty of care first to support customers where they are sole suppliers".

3.7 Priority supply and the shortcomings of contractual cover

One thing that companies from all parts of the industry agreed upon was that whilst it helps to know who else your suppliers' supply, contractual cover as a contingency for supply chain disruptions is largely unworkable.

"We ask top tier suppliers to do an evaluation when we take them on and do regular reviews. We do stockholding, capacity and priority supply".

"The company does have Force Majeure clauses in its contracts but no standard definition given in terms and conditions. It excludes strikes by suppliers and subcontractors. Suing the supplier is one thing. You have to make sure you have other contingencies in place".

"Priority contracts are not in place because suppliers would say 'get lost because we have to supply Tesco and the other big retailers first'. The company is not itself bound by any priority contracts and cannot get suppliers on 'unfair treatment' either. Force Majeure is in contracts, but not defined. If a service supplier failed to provide service for 'x' days we would take over the activity".

"Priority contracts are something that would only be done with vital suppliers e.g. that would affect production of key product lines. For service contracts there have been issues with interpretation of outsourced service contracts e.g. Dutch supplier service agreement guaranteed response within 24 hours. But this was within 24 working hours of them acknowledging notification, not within 24 hours of notification being sent i.e. up to 72 hours. For service agreements it is essential to get performance data and feedback from ops level staff not from managers. Attitudes are changing towards Force Majeure for things like loss of power. If the supplier doesn't have it or don't have contingencies in place they should let the company know".

"Under many of its contracts the company is not liable if a distribution site is lost, it comes under Force Majeure and the cost falls to the customer. All contracts assume that it will be for operating under normal circumstances, all are cost-plus open book agreements. Force

Majeure is 'anything beyond our control including strikes, flood, fire,, terrorism, government change".

3.7.1 Disruptions to supply: the manufacturers' perspective

The food processors were potentially much more vulnerable to supply chain disruptions than their retail counterparts. They were exposed to all of the hazards faced by the retailers e.g. failure of utilities, and many more. The lack of a key ingredient, capital equipment and the availability of transport and distribution capacity in the marketplace were all mentioned. However, when it came to actual disruptions and near misses involving the failure of critical suppliers one group stood out: packaging. The root causes of some of the problems were higher up the supply chain, with raw materials producers in the global gas and petrochemical industry.

"A bespoke packaging supplier caused us problems when it moved a site with no contingency in place. 'Plan B' was to do 'Plan A' properly. It had closed the old site and we were down to only two weeks total cover for our biggest global customer".

"We would definitely have a problem if one of our canning plants were lost. The failure of packaging or canning suppliers would halt our operations".

"Our main packaging manufacturer was beaten into administration in November 2004. We had to switch 250 different bread bag designs to other suppliers in 4 weeks. There were capacity problems with our other supplier. Had to buy in bags from Canada, Poland, Portugal and Scandinavia. The risk had been identified and highlighted but still came as a shock because it need not have happened".

"Loss of any of our packaging suppliers would be a problem. Capital equipment issues would have to be sorted. We have a UK specific pre-form bottle".

"The failure of a plastic bottle supplier would halt operations because of 'hole in the wall' in-plants. For all others we have back-up supplies of parts, labels, caps etc. We have 2 plastic bottle suppliers and there is inter-changeability so we could bring bottles in from another place. If one of the packer's plants burned down they would have volume supply problems".

3.7.2 Partnering and industry consolidation

Some food processors were confident that a combination of their supplier management capabilities, multiple sourcing strategies, and prudent continuity management by their suppliers would reduce supply chain risk to acceptable levels. Others were aware that their tightly coupled 'partnerships' could not be easily undone or rapidly replaced.

"Managing the supplier base (packaging and raw materials) is part of what we do. We expect our suppliers to understand the process and have plans in place. For example, to mitigate against ingredient disruption we have 5 flexible suppliers. We have gone from total of 400 to 300 suppliers in the UK. If we have only one supplier (e.g. packaging materials), contractual reviews covers things like from exactly where would we source. They are required to demonstrate – by testing – that 10-20% of volume can come from an alternative location. It is a judgement as to whether redundancy/capacity is available from alternative sources".

"Supplies can be redirected from alternative sites, but it is very difficult to switch suppliers at short notice. Co-manufacturers and co-producers are linked into our systems to have visibility of usage and facilitate vendor managed inventory (VMI) arrangements. For packaging the company is moving further towards generic packaging for all markets, using the principle of postponement to print labels etc as and when required. This is changing the risk profile by shifting the risk to different parts of the process with increased reliance on different pieces of capital equipment".

Dual sourcing could spread the risk of failure, but more than one company (including one of the largest retailers) pointed out that industry consolidation was rapidly reducing the array of viable switching options.

"For materials handling equipment, there is only one supplier of pallets, a global operator which is now doubling its rates".

"The company is being squeezed. Suppliers are consolidating. There is no longer a market. Now we have to be nice to British Energy to keep them supplying us and to our industrial gasses supplier because we need gas to kill poultry. We wouldn't be able to switch supply quickly. There is another company for industrial gasses but there is not enough capacity. We carry only 1-2 weeks stock. It is a capital intensive supply chain. Have alternatives for most other suppliers – including packaging".

"The biggest challenge is consolidation of the supply chain - the number of big suppliers will continue to reduce. If you lose one big supplier, the effect is going to get bigger. Where there is only one very big customer with around 45% share of the UK market, that becomes a big problem for suppliers. If someone has half of the trade then suppliers are going to be increasingly stretched and exclusive. It will reduce suppliers because few can manage that volume – they will be major multinationals"

"There has been a rationalisation of suppliers over time. Supplier relationships are very important. If push comes to shove retailers would help out the suppliers in the short term. Retailers are not that sympathetic. They would help them out short term but likely be looking outside the UK at the same time for alternatives".

"Apart from the loss of power, only the loss of one of the polymer suppliers would stop our operations. We have one big one and three smaller ones. If any of the top 3 went down without notice we would have a shortfall in tonnage. If the market is not tight, others would supply. This is commodity market dependent. You can always get material if you are prepared to pay a high enough price. We audit our large supplier's processes via ISO and BRC accreditation and audit a couple of times per year, but we don't say you must hold 'x' amount of stock. We can't, we are 'just a flea on the dog's back'. We don't have the power to dictate to them. These guys are huge. If we sat down and said that it is critical that you hold cover, they might say we are already doing that. Polymer suppliers often put Force Majeure in. Their definition is quite extensive, it even includes poor manufacturing or major breakdown. A Force Majeure incident with them would come at a price".

3.7.3 Market -based contingencies for raw materials

Only the largest food processing companies enjoyed the ability to switch sources of supply in the same way as the largest retailers did. The same is true of the packagers. In many instances the suppliers concerned were global commodity producers/brokers. Here global market-based contingencies came into play, rather than asset-based continuity planning or 'partnerships' agreements.

"Produce doesn't have any contracts with any suppliers. It is too high risk to have a contract. Contracts tie you into a trading environment. We don't even have contracts with critical service suppliers. The only contract is a dedicated supply contract between us and our customer. That's the only one the customer has. There are too many grey areas and a million and one ways that contracts could be breached. There are too many variables with fresh produce. The only exception might be for block space with an airline".

"Most key products/volume lines have contingency planning. Commodities e.g. chicken breasts have multiple suppliers".

"Increasingly tight supply chains mean that it can be an immediate supplier or someone higher up the chain or even customers that can disrupt things. Some of our ingredients are wheat (UK) company buys 'dirty wheat' from the farm via bulk agricultural commodity suppliers; maize from Argentina (GM free); rice, mostly from Northern Italy; Oats from the UK. All but wheat is pre-processed. Other ingredients are vitamins (very complex sourcing), sugar and dried fruit (from Philippines etc). It is a business objective to grow the supplier base for key ingredients. Dual supply is expensive and resource hungry, part of that is a 'security/resilience' audit issue e.g. dual sites. We are physically reducing the supplier base but widening the base by going to e-auction. More companies have been approached as potential bidders, reversing the 'partnering' strategy. There are only 2 large suppliers for

one of our prepared ingredients in the UK, one is a dedicated supplier to our competitor and the other is not cooperative. The industry is consolidating so we have been buying up equipment. We are trying to avoid monopoly supply. There is friction between us and them over ambitions for vertical integration. We are not getting a good service so have gone to the importers' Industry Association for other options".

"The company is dependent on grain for feed, the availability of grain is critical. We have agreements with suppliers and futures options. Grain is a worldwide market. We are looking for GM free and eco-friendly."

Inevitably even true market-based contingencies leave customers exposed to the possibility of shortages. Crop failures in the East of England and the everyday hazards of livestock rearing were singled out. With more of the UK's food grown overseas, processors and ingredient suppliers were watchful for fluctuations in global crop production and the impact of crop failures.

"Packaging is a known weakness e.g. the non-availability of resin/polymer. There was a global shortage last year".

"We like to know what would and wouldn't affect us as an organisation e.g. frosts in the Ukraine. There are so many things that are outside of our control. We spend lots of time checking out scenarios e.g. production of soya in India. We watch global events and pay lots of subscriptions to information sources".

"There are no back-ups for major crop failures. I experienced this in a previous role with palm oil. It took 18 months to reformulate products, but that is not an option with bread and wheat. If there was a major crop contamination e.g. Chernobyl or a whole season crop failure we'd have to think about where would the flour supplies come from, plus transport issues."

3.7.4 Transport services: another commodity?

Transport services, particularly road haulage, has tended to be regarded as another commodity (i.e. it has multiple users and multiple sources of supply) by retailers and large manufacturers. Some producers of short-shelf life products have made strategic decisions to retain tight control of their own transport services, but they have been in the minority.

"We have put in lots of recent investment in the vehicle fleet. 100% owned and run in-house with garages at each depot and in-house roadside assistance. Do most of our own collection and trunking is in-house. We only use externals for ad-hoc emergency cover. Have a list of fall back 24 hour notice hauliers. We are a very vertically integrated company. We don't like outsourcing. It is a low margin business but informed management have invested carefully. There are 2 key parts of the business – processing and distribution. Vertical integration gives control".

Most of the organisations involved in this study looked to third-party transport suppliers to provide cheap and flexible services, often via a 3PL and backed up on occasion with approved smaller haulage contractors. However, attitudes do seem to be changing. There is recognition that transport may not be just another universally available commodity to be purchased at the lowest price.

> *"Transport is 3rd party with around 50 subcontractors. These are relatively small e.g. out of 50 vehicles we use 25, but we are up to 100% of their business".*
>
> *"Transport is partly determined by margin. The company now buys many products at factory gate prices to help reduce price to our customers. Sometimes the company collects with its own fleet, sometimes it backhauls. Sometimes the rest is Dutch auctioned, which extends the reach of vulnerability, e.g. the implications for a pandemic. Market forces come in here. The same is so with providers of security services. The company is now relying heavily on 3rd party hauliers. It gives resilience from internal disputes, but creates a weakness in externally induced scenarios. Many of them are small contactors".*
>
> *"The major retailers had transport shortages before Christmas, which means a shortage of capacity. Smaller people are going to the wall in road haulage. There is a shortage of HGV drivers. The government has plans to use retired HGV drivers and fire crews in an emergency. Not a good option. Many retired drivers had to retire because of heart conditions or poor eye sight".*
>
> *"There is pressure from strategic purchasing to reduce the number of suppliers to get a better price, e.g. would like one transport company, but we have resisted this and kept 3 main transport suppliers and one other. Dual sourcing is maintained for our key product sourcing as a quality safeguard as well as a contingency. To date local expertise and knowledge has won the day, and stopped the excesses of lowest price purchasing. We have maintained a total cost approach".*
>
> *"Who is the key worker? Retailers have squeezed the transport services to get rid of any flex. People don't have an extra 10 vehicles, they are only maintaining assets that they can use…If there is a hiccup in one region there is not enough capacity elsewhere. Margins and labour shortages mean it's a shrinking base e.g. if we lost a logistics provider and phoned one of the big 3PLs to cover they would have to scratch around for odd vehicles here and there, particularly a problem because the product is temperature controlled. For live bird movements it is even worse because we use specific trailers and crates with very specialised materials handling equipment".*
>
> *"There has been lots of consolidation in the industry, most of the fresh and chilled primary work is handled by smaller specialist companies".*
>
> *"We changed contractors on chilled distribution. The new company fell over within a day. It resulted in loss of supply for a week to the big*

supermarkets. Now we have redundant capacity for transport. The new supplier didn't have the staff and understand fully the requirement".

3.8 The macro-environment and the globalisation of sourcing and supply

There was widespread agreement amongst retailers, processors, ingredient suppliers and packagers that the UK's supply chains were far more dependent on global sourcing and supply than most other large developed economies. Furthermore, the dependence on overseas production was considered to be increasing all the time. Evidence of this can be seen in the profile of applicants to The British Retail Consortium (BRC) certification scheme. The scheme has been cited by a number of organisations involved in this study. It provides approved industry standards for suppliers of finished products and ingredients to the major UK retailers. The BRC has certificated suppliers in 69 different countries.

"The UK retailers are vastly reliant on international trade. People are not always aware of how truly global the British retail/food sector is. It is totally different from France and even Germany. In the UK 45% of spend is on own label and about 60%+ is imported. In France only 14% is own label and 70% of French own label products are produced in France. E.g. wine and produce, the French buy local. UK buys from across the globe. The UK is also different from the US market in that the retailers drive standards in the UK. In the US it is the big branded food manufacturers".

"India now sees itself as a future major supplier of food to the UK. Indian growers are looking to get the BRC Standard. It's the same for packaging. Indian packagers and the Chinese are approaching BRC about its packaging standard…More and more packaging is being produced in India and China".

3.9 Industries and economies

A combination of market forces – in the form of competitive pressures for cost reduction from and amongst the large retailers – and government policy on energy costs and regulation (e.g. the banning of the use of tallow for fuel) were cited. In addition, ambient and frozen food processing is increasingly moving closer to the sources of raw materials e.g. the Ukraine for grain, meat from South America, Eastern Europe and the Far East. In a global marketplace some of the food processors have simply decided to invest in parts which offer better opportunities for growth and a better return on investment. The packagers are following the producers of ambient packaged foodstuffs overseas.

"The local packaging plant is about to close. The customer, a processed foods manufacturer, is to invest in Russia instead. It is part of a virtuous development cycle which helps support growth in emerging markets for consumer products."

"We've bought frozen chicken from Brazil since 1998, now also buying from Argentina and Chile (South American contingency). We've also developed relationships or joint ventures with Polish, German and Hungarian producers. Fresh poultry production in Europe is only an economic option in the new EU accession states. Commercially Thailand and Brazil are low cost producers. Thailand is mainly cooked chicken products after avian influenza became a problem. Most of the big retailers are buying in frozen cooked products. Only one major turkey producer is producing from fresh. Brazil is an approved source, Thailand does not have such good welfare conditions. In the US most of the feed is GM soya or meat and bone meal. Retailers don't like that. The UK is the biggest buyer of Brazilian poultry. This is retailer driven, it has driven local production away".

"Food manufacturing in the UK is dying out. Own brand manufacturers are being price pressured by the retailers forcing them off-shore. It's a good thing for specialist transport and distribution service providers!"

"Glass packaging producers are all loss making because of high energy prices. The price of gas is higher in the UK than the rest of Europe. It is one element that is driving the packaging industry overseas. Suppliers of gas are not coming through the inter-connector from Europe at the volume we would expect i.e. 15% of capacity even though the UK offers the highest prices. The others countries are holding strategic reserves. The North Sea does not supply enough gas, UK infrastructure is very poor and storage capacity is low. Other countries are ignoring the EU rules and holding strategic reserves".

Whilst ambient and frozen food production moves overseas, the growth in consumption of chilled prepared foods has increased. These lines, together with short shelf-life products such as bread and milk, are much more likely to be produced and packaged or prepared (often from frozen/imported ingredients) in the UK. The polymer production and the production of industrial gasses required to keep packed chilled food fresh is also moving off-shore.

"A lot of our main raw material (polymer) comes across the channel. Strikes in France make things tight. A major incident on the continent would impact us. The polymer feedstock comes from the Netherlands and France. We are also looking to try sourcing material out of the Middle East as a further contingency. There is a dual logic: Gas-based material for feedstock raw materials is cheaper. Don't know the full logistics costs and viability of material yet".

"Carbon dioxide is no longer produced in the UK. We need it for food processing gas (modified air gas for packaging to extend product life). It used to be produced in the UK as a by-product of fertilizer production. There used to be lots of fertilizer produced in the UK, but because farmers are pulling out of food production in this country, ICI got out of it and sold the business to a US company. Prices forced the closure of the fertilizer plants. One plant was shut for maintenance. The US

closed all the others because they were not viable. Now have to tanker it in from Europe at higher cost".

One industry that has hitherto been protected from global forces by consumer preferences (but not EU competition policy) is milk. The UK is unique in Europe in that most milk is consumed fresh rather than as UHT. Post-deregulation it has continued to work very effectively together to overcome disruptions in supply. Milk production at farms is naturally skewed toward the summer months, but cooperation throughout the supply chain has always allowed the industry to balance, production, supply and demand, and enable it to manage season variations, panic buying and other disruptive events. However, no industry is immune from competitive pressures of international trade and the drive for efficiency. Incentives are being offered to farmers to increase out-of-season production, which will allow processors to improve asset utilisation and reduce redundant capacity in processing plants. Companies from four tiers of the supply chain explain:

"The business collects from 3,500 farms, but then it goes to relatively few processing sites where it is pasteurised and bottled. We don't supply more than about 6 liquid sites. 50% of UK milk production goes for drinking. It all goes to the 'super dairies'. 30% of milk is used as cheese, the rest is yoghurts, butter powder and desserts. Most milk is produced in spring and early summer. The industry needs butter cheese and yoghurt factories to use and manage demand/supply all year round – these are the 'balancing plants'. Milk has a very short life, only 2-3 days maximum, so is often in silos for less than 24 hours. We are networked with all major processors and there is flexibility built into cheese and butter powder contracts. The supermarkets call the tune to the processors. Some supermarkets may suddenly increase all liquid by 10-15% and divert short-term from balancing plants".

"We do work with competitors for joint haulage/milk swaps etc (similar to petrol distribution) e.g. in adverse/severe weather conditions. Would look to provide liquid and fresh customers first over the manufacturers. We had plans for a bad cold snap in place this winter. We push and pull on a daily basis e.g. when one of the other companies had boiler problems that meant it was at half capacity, the industry looked to divert additional milk to where there was capacity for 2-3 days. For a crisis it would be the same thing but on a bigger scale. For big events companies in the industry do work with their competitors".

"We have reciprocal arrangements with a rival diary to provide 200,000 litres. It is a long-standing agreement. We have not tested it. The other company has changed and leaned down their business so I'm not sure whether they could still cover. We've had calls from a customer when a competitor failed to cover a number of stores and have completely changed the way we deliver to one customer, so instead of going to DC at Christmas we went direct to stores, we were also cross-docking for direct competitors to deliver to a big customer".

"We produce packaging for Milk. Demand is not seasonal, the only variation is Christmas and we build to stock for that in late October. In

summer there is a drop in the size of the containers. Demand increases at the coast and people buy smaller containers when they are on holiday. When a major competitor had a fire at a bulk customer's site, the customer came to us. It is the customer, not the competitor that comes to us 70% of the time. 30% of the time it is when smaller competitors come to us to supply customers. If their customers have a major failure e.g. a dairy burned down, they would fully utilise their own capacity first. Then their customer e.g. Tesco would phone alternative suppliers who would need additional bottles. It involves a resource/demand transfer from the damaged site. We can't do this as easily as 2 years ago because of reduced capacity".

"There is some trend towards the reduction of balancing plants with efforts to stabilise seasonal changes in demand and supply. Production never will be flat. The factories don't run all the time, but need to retain the capacity to provide flexibility for the industry. It is important that all activities are maintained in the UK. Some powder imports are coming into the UK as UK powder is reduced".

"One of the large retailers has recently started bringing in fresh organic milk from Denmark".

The restructuring of the sugar industry, in advance of changes in EU trade policy, came through as another area where indigenous capacity is giving way to competition and market forces, leading to uncertainty of supply.

"EU sugar regime is ending protection of EU market and the practice of dumping on other markets. Europe has to lose 5m tonnes of sugar refining capacity, so some sugar producers are not planting sugar. Farmers are being subsidised to transfer to other crops. Some markets will have a deficit which will have to be filled. We are working on strategies to deal with this".

Section 4. Specific Scenarios: Large Scale 'Systemic Disruptions'

4.1 Introduction

This section deals with known weaknesses within food and drink industry supply chains, in particular the likely impact of three 'effects-based' scenarios:

- Disruption to fuel supplies for road transport
- Disruptions to energy supplies
- Disruptions from infectious disease.

The events are often deemed by companies to be 'external' to their organisations and supply chains and therefore beyond their immediate control. Yet each of the three scenarios has the potential to take out common elements of all food and drink industry supply chains. All have recent presidents in the UK or in other developed economies around the world. The scenarios fall within the capability workstreams of the Cabinet Office Capabilities Programme and reflect the kind of events that managers were quick to identify as real threats to continuity.

> *"Power, product or people could stop operations. The people issue would be driven by something like SARS or petrol shortages".*

> *"[It could be] a prolonged cold spell and rolling power cuts, bird flu, strikes or a changing political environment e.g. 3 day working week or fuel crisis".*

4.2 Fuel shortages

The fuel protest of September 2000 is perhaps the most widely recognised and far reaching 'creeping crisis' to affect all sectors of industry to date[4].

4.2.1 The retailers and the 3PLs

During the crisis in 2000, and the more recent scare in 2005, the independent stores involved in this study had continued to receive supplies of food as usual, though one reported being unable to make deliveries to an old people's home. Some suppliers of non-food categories (e.g. batteries) had failed, but there had been no food shortages or panic buying of food at the independent stores. Two of the three independent store managers confirmed that sales had increased during the fuel shortages because people had been unable to travel. Another store manager and forecourt operator reported the reverse effect. Far from experiencing panic buying of food during the recent fuel crises, food sales at his stores had plummeted. The crises reversed the usual relationship between food and fuel provision:

[4] The interviews for this study were conducted before Exercise Gemini, the cross-government/industry simulation exercise that took place in May 2006.

"There is no profit in fuel sales but normally it helps store sales. During the fuel scares sales crashed because everyone was focused on fuel! During the recent [September 05] scare we stocked up and used spare capacity at the retail site, but got through 4 days fuel stock in one. Supplies were stripped between 2.30 and 3.00pm on the day. To reduce the hostility of customers, staff took coffee out to the people in the queues. Order can break down very quickly. In 2000 the police managed the rationing – one policeman to authorise and one to keep order. We need Government to verbalise the policy for priority users very publicly. A four page list of priority customers is a problem for forecourt staff".

The issue of security was brought up by some of the larger wholesale and retail companies, who believed that Government would deploy the army to remove any threat to fuel distribution.

"I think the level of resilience has increased because the Government, if it happened again, would just put the Army in there. End of story. The Army would break up any protests and any blockade".

"If it needed the Army to deliver the fuel, we would be after the blue light services and after MI5 etc, then food distribution's needs are on the top of the shelf. That would be alright, they would deliver the fuel for our lorries, but you then need to say 'would they deliver the fuel for our drivers to get to work to drive the lorries?' That gets a bit more complicated".

The big retailers and wholesalers had also weathered the 2000 fuel protest and subsequent scares relatively well, though even some of the largest operators admitted that it was a close run thing. Large supermarkets with their own forecourts were particularly well placed to ensure distribution to stores continued. Some had increased fuel stockholdings in anticipation, but panic buying quickly drained supplies.

"Fuel shortage has been an issue in the past. The company managed, but only because plans and storage capacity were prepared in advance. The company saw the crisis coming 3-4 months out and put in place additional tanks and purchasing arrangements, then kept tanks full just in case. This meant that could help out its suppliers when they were short. Had it simply relied on being a big customer of the petrol supplier it would not have come through, it would have run out, particularly as it was helping suppliers… Post-fuel shortage, there are higher fuel stock holdings at DCs and they are kept topped up at all times. The company has the ability to prioritise delivery volume to outlets (i.e. be selective about which lines are re-supplied). If an order is turned down due to shortages, the volume of product to outlets and therefore the number of vehicles required can be reduced. Branch stocks can be run down, except for nominated items/lines. The company is a priority user for fuel".

""The fuel crisis was the only thing that would have stopped the company's distribution system. The backrooms in the stores are not big. All the stock is out at the distribution centres. If you can't distribute from there you have a difficulty. During the fuel crisis our main rivals were all geared up to keep stores running but our suppliers couldn't get to us! If we'd had a commercial director there at the time he would have flagged that up…The panic response is often worse than the actual incident. During the last potential petrol crisis [2005], even though there was not much media focus this time, 60-70 sites had to close because they were out of petrol and it took 4 days to recover because we'd used up all the reserves. The company has a tanker fleet of specialist vehicles and specialist drivers, but transport was constrained by fuel deliveries. The company can supply 5 million litres a day, in the 3-4 days when there were fears of shortages it sold 8 million per day and used up all its reserves. The media were very responsible this time – this was not full scale panic buying".

"At the point of the first fuel protests, we actually doubled the size of the tanks. We are in a supply agreement with our 3PL, we buy our fuel through them and as long as there is something moving then we get something. One thing that we have tended to do previously during a fuel crisis quite quickly is get the retail sites to stop selling diesel to the public so that in some cases our vehicles could fill up in our own petrol stations with diesel. We have got fewer of them now so that's less likely to work. We are spread all over the country, so we could start putting something in place to fuel our vehicles in different locations. You have got to balance it against the public perception of what you are up to".

"The fuel blockades in 2000, and more recently [2005] - when one was threatened, but was a non-event - generated some customer reaction. The company overstocked head office storage tanks, but they were drained by the company's own staff. Normal stockholding of 7 days was increased to 10 days but drained in 2 days… During a crisis we all work very closely with our suppliers to minimise the effect on consumers. For example, during the 2000 crisis we shared our fuel supplies with our suppliers and would do so again. Buncefield was another near miss. It accounted for 15% of our fuel supply to the South East".

The third party logistics providers both survived the 2000 fuel protest, though one admitted to being less than 48 hours away from a significant disruption to service to their supermarket clients.

"The fuel protests [2000] were the closest to being a problem. They had little impact on operations, apart from tankers. The company has very big storage tanks and there is warning of fuel protests".

"During the fuel protest we were within 2 days of supplies to stores being disrupted. The smaller customers were screaming for help with fuel 'Can't you go Ireland'?'. The decision was taken that the big supermarkets had their own fuel and are major suppliers. One big

retailer's tankers had police escorts to deliver fuel to our sites. We focused on support to healthcare customers and essential users".

4.2.2 The Priority User Scheme

The difficulties the priority user scheme posed to forecourt staff have already been highlighted by one of the independent retailers. Many other interviewees made vague reference to it. Some industry association representatives and manufacturing companies expressed more explicit concerns about the viability of the scheme and the validity of the assumptions on which it was based.

"Fuel priority user certificates are handled by the local authorities. Some companies have a Head Office in one part of the country and other facilities and factories all over the rest. Defra say priority users would be a centralised problem, but the local authorities don't have a budget or see why they should help out in another region. Responsibility for companies with dispersed locations if very unclear. It is a problem of having responsibility for this with Local Authorities".

"The Priority User scheme might not work in the time scale available. Local Authorities take a week to process applications. They need to have everything set up and ready to go in advance, but there is no money at the Local Authorities or National Government. Discussions with all larger members tell us that if the fuel protests had lasted another three days everyone would have been in trouble. And there would have been a knock-on effect in electricity (oil fired power stations). Some are pipeline fed, but the feed of unrefined fuel is possibly vulnerable. Since the fuel protests, larger companies have put in additional tankerage and some large members have gone to big customers (supermarkets) and said if there is a crisis we need to do a deal on fuel for the period of the crisis. These are in place. Members don't like to talk about it, but they have contingency plans in place".

"The biggest danger in a crisis is misinformation, including wrong assumptions within Government, it creates a major problem, poor planning and incorrect use of data for decision making. The 3PLs held petrol stocks in the past, but some companies now rely on the public supply and fill up at petrol stations. The cost of holding fuel is too high. Government is not always in touch with industry practice and may be using outdated assumptions. It was the same with foot and mouth".

Some of the largest branded food processors also confirmed that their customers had helped them through the previous crisis by providing fuel. Others suppliers of foodstuffs were able to continue operations, thanks to their transport providers' or in-house fuel reserves. Some of the importers were able to fill vehicles in Europe.

"In the fuel shortage a large supermarket group sold the company some fuel. It prioritised suppliers".

"During the 2000 fuel shortages the company did offer to work with one of our biggest customers to deliver direct to store. It provided fuel to

suppliers and had reciprocal arrangements in place with some of the customers allowing each other to fill up".

"We were not affected by 2000 fuel protests, but anything that disrupts transport for us is a problem".

"The fuel protest brought into focus how dependent we are on fuel. It didn't disrupt the company but would have done by the end of the week. During the protests the company did get some fuel from a big supermarket – but it was charged at a premium. As a food manufacturing company we might get priority user status, but we don't have an in-house transport fleet. Would our small fleet suppliers get fuel? They could create a 'negative' list at DTi of companies that could be shut down e.g. electronics etc".

"Employees have fuel exemption because of bird welfare. We were not affected by fuel protests because contractors carried enough fuel. We had 2 sets of bunkering and had own petrol and diesel pumps. We no longer have these because of pilfering. Need to maintain a supply to bus staff in".

"The company has some preferential status with government for fuel…Don't know whether suppliers (other than fuel suppliers) are covered e.g. packaging suppliers. Would they be able to get to us? The "cradle to grave" supply chain is not necessarily covered".

Nevertheless several companies, including food processors and packagers reported having been caught out by the protests and at least one of the most sensitive categories had not been able to secure enough fuel to maintain delivery to non-retail customers.

"During the 2000 fuel protest we came within 12 hours of having to suspend operations".

"A fuel crisis management plan is in place. The 2000 fuel crisis was a near miss, we were within 1 to 1 and a half days of running into trouble at some sites on in-bound delivery. We hold sufficient diesel for a run of 7 days at all sites. The company does quite a bit of trunking, otherwise there would be difficulties… Waste disposal could become a problem quite quickly because of hygiene. Would likely stop production before waste became an issue".

"The fuel crisis did have an impact, we fell foul, the same as everyone else. We managed to operate longer than some, but that did stop sites. We were able to feed off stocks so that did not affect on-shelf availability".

"There are some areas were we need support and collaboration from Government e.g. during the 2000 fuel protests we had the right to get fuel as a priority user, but we couldn't get it. We managed to scrape through due to the 'queuing capabilities' of the transport providers.

Many of the lorries filled up in France. The priority user system broke down, but the carriers took their own action. The company had expected proactive support from the authorities, but it didn't happen. Infant formula is needed for hospitals as well as supermarkets".

FUEL PROTESTS: THE BENEFITS OF PREPARATION

"For a national emergency we have our own on-site storage for fuel and have site storage at locations in the UK, at key depots. If strike action is likely we fill up. We use industry contacts and purchase in extra tankers. We have very good links with fuel companies and we have staff with licences to deliver the fuel. Also have a network of hauliers. If we know problems are coming we ask hauliers to stock up and bunker. We use mid-sized/large regional hauliers not the very big nationals. We have also spoken to all our customers in the food industry re bunkering fuel at their premises –they have said yes if the fuel is available. Manufacturers are very keen to work with you to keep things going. The retailers had fuel and agreed to sell it if required.

We have red diesel which is used on site and have spoken to government about the possibility of using red diesel. Have had a provisional yes, but it colours the tanks for 12 months after.

In 2000 we saw the fuel protest coming and made arrangements. We were only caught out by the staff letter issue. We did get approval letters to allow staff to get fuel to come to work. Only about 15 letters were used. Most people could get fuel. Car sharing was not practical, but the company adjusted work patterns to assist employees transport problems if required.

The final thing we did in advance was disperse buffer stocks. We moved more stock to regional depots to overcome localised shortages e.g. in London. The company has most of its product storage very close to site (within around 5 miles). When fuel was available we moved stock around the country to keep it
near e
starte lk
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comp

4.3 Loss of power

Disruption to the nation's energy supplies provides the backdrop to the second scenario examined in this study. Loss of utilities was cited by all of the companies as a threat to operations. The main focus of this section is on the effects of a widespread or prolonged failure of the National Grid, although some probable implications of gas or water shortages were also suggested. Water is mentioned briefly at the end of this section.

The question about policies for loss of power supplies revealed that Head Offices were supported by UPS for IT. Almost all distribution centres had diesel-powered

emergency generators, that were tested on a regular basis. In most instances the generators would maintain some (but not all) of the requirements of the facilities concerned, i.e. essential IT systems and emergency lighting were likely to be supported, but air conditioning was not.

4.3.1 Loss of electricity to retail sites

One thing that was striking about this scenario was the degree of agreement amongst the retailers and wholesalers about the difficulties they would face in the event of widespread or prolonged power shortages.

Retail sites, smaller supermarkets, convenience stores and cash & carries did not have back-up generators. Contrary to the expectations of some of their branded foods suppliers and transport service providers, even the large supermarkets revealed that they did not have back-up generators in all of their stores either. At least one very large operator had taken a conscious business decision not to install back-up provision in its newest superstores. The reliability of electricity supply was (at the time of the decision) judged to be such that the investment in alternative power could not be justified. The usual procedure during a power cut was to 'manage for closure' – i.e. clear the store of customers and close it.

> *"The company has back-up generators at key sites, but not in all stores and certainly not in the smaller ones…smaller sites are not being retro-fitted… The DCs all have back-up, so do the data centre and HQs. In the event of a power failure the stores currently close down until the power can be restored. We do have back-up generators in stores which were built in the last 10 years. These are designed to support essential services only and for a limited time. If we were faced with a long term disruption in power supply we could, in theory, use the generators to power tills and lighting to enable us to trade in basic items, however the store environment and refrigeration would be unsupported (30% store lighting, no cabinet lights, no air conditioning or heating, no freezers etc). This would require additional fuel at stores and a fuel replenishment process. This type of contingency does not exist presently".*

> *"Most of the older stores have back-up power to get them through for 3-4 hours to keep the freezers and tills up. There is no provision for several days, only enough to get people out of the stores. Cost-analysis has been done on this. Power supplies are very reliable and it is not cheap to provide back-up... Many of the newer stores would not be able to operate because of lighting requirements. Stores without generators would be closed and we'd have to source generators. In a widespread outage this could be a problem…There is a greater skew towards fresh nowadays. All that would be left after a while would be ambient. Around 25% of produce is chilled, diary, produce, baking etc that would be affected".*

> *"A power cut of more than 3 hours at branch and 24 hours at DC would result in loss of stock and require replenishment. There is stand-by power, but the branches do not have generators. If it was one site only*

the company would likely bring generators in. The company plans for single points of failure not multiple. It could bring a single point back up, but not multiple points or for sustained periods. We would lose less if we had to close a site then a large retailer like Tesco. The company's planning is not for national emergency situations. The country has not had this problem for 30 years so it is outside its planning/contingency horizon".

"We are a small store operator. There are no generators in stores. They rely on the National Grid. So if you have a power outage, very quickly you will loose temperature within the chilled units, so that food would probably have to be discarded, if it went on for any period of time, then also frozen food".

"In the event of rolling power cuts the company would open its branches when the power was on. It is mostly an ambient business. Products have shelve lives of one year plus. Some short life products e.g. yogurt and cheese etc. have 2 month shelf life. Frozen/chilled account for only around 10% of sales. The company has very low footfall and very high spend. If an independent retailer wants to do a 'black out special' one individual could wipe us out of some lines at branch and we do see it, but hope that the branch manager would stop that. No customer can buy more than £2000 of any given product without senior management authorization. Rather than introduce new procedures, the company could always adjust existing guidelines to accommodate new circumstances e.g. drop the spend limit per product from £2K to £250".

4.3.2 Paper-based working and retail security

One of the most obvious problems cited by all of the retailers and wholesale companies was maintaining payment systems at stores without power. Upgrades in till technology and 'chip and pin' meant that all of the major retailers had withdrawn paper-based credit card swipe systems two or three years ago. The wholesalers would immediately fall foul of traceability requirements.

"We could, go to paper-based, but it would take time. We are obliged to provide receipts for all goods sold. This could in theory be done manually in the event of a long term power failure, but it would be extremely difficult as we would not have price data and therefore would have to manually price label all goods in the store. We don't currently have any pre- prepared capability for producing manual receipts in the stores".

"The company could possibly go to paper-based tills in the stores. They still had swipe manual credit card systems in stores 2 or 3 years ago. For trolley loads of shopping staff would use a 'guesstimate' system".

"In a branch one problem would be that people couldn't see. It would be possible to take customer registration numbers and work manual tills to record who had what, but it would not be sustainable. We could continue to do business but emergency legislation would be needed to

short circuit specific legislation e.g. traceability. It is possible, but not desirable".

Stock replenishment systems are linked to the tills using EPOS (electronic point of sale) systems. The retailers, including the small independents, all stated that replenishment would be compromised by the use of manual tills.

> *"If the business were to lose its power supply, it would be difficult, but not impossible, to run on paper-based systems. One large grocery multiple still does it today, but your replenishment systems would be very clunky "*
>
> *"If the tills go down it complicates and changes the business model. It disrupts order fulfilment process and store card activity. It totally disrupts internal process dependencies…we have experienced problems before with our ordering system (business-to-business)".*
>
> *"If the power goes down, then the replenishment systems run on an automatic estimate of order requirement. Accuracy for that degrades after about 3 days".*

As for the small independent retailers, they would lose all of their tills. Maximum terminal life was two 2-3 hours without power. None of the convenience stores had generators. One used to have back-up cover, but the company removed the generators because of Health and Safety concerns over temporary power supplies. The sole trader thought that, in a prolonged black-out, he would rig up his own home generator (in contravention of new building regulations governing electrical work), but this would not carry the load from the air conditioning, which could be a problem in the summer. The independent store managers pointed out that nowadays most good independent stores also rely on bar-code scanning for pricing, not calculators and stick on price labels. Even the sole trader was heavily dependent on a functioning EPOS system to manage replenishment.

The convenience stores would very quickly be forced to abandon sales of chilled and frozen produce and revert to fresh and ambient. Most fridges and chest freezers in their stores are open, as research has shown that they increase trade by 33%, and whilst modern fridges run very efficiently, they require triple loading to kick in. If power is lost a blind can be pulled down, but most stock is likely to last for less than two hours, some for only half an hour before it becomes unsaleable. The independents also pointed out that stores that sold petrol would lose power to the forecourts.

The other problem highlighted by convenience stores would be security, as the alarms go down if power is lost. Battery life is only around 18 hours. One convenience store manager confirmed that it was company policy to evacuate and close a store if power was lost. The company had business interruption insurance but he remained on site to 'baby sit' his store until power supplies were resumed. The managers agreed that it might be possible to operate a kiosk arrangement with staff in the front of the stores with doors locked, passing goods through, but the security risk was potentially huge and it would be difficult to evaluate payments.

4.3.3 Keeping the distribution centres running

The wholesalers and retailers' 3PLs explained about generator provision at the DCs and its limitations.

> *"When we started business continuity planning the first things we did was to make sure all our distribution sites had stand alone generators so we can self power up, to the point that they are automatic, so the depot wouldn't even necessarily know it had had a power cut. They are tested weekly for a start up. Every six months they are supposed to run a test that actually makes the generator kick in…It worked when the lights went out in Nottingham. I was there. Our lights went dim, but beyond that it was business as normal, and we operated for about 3 hours without any power. We were the only site in the area that did. The generator runs for 8 hours before you have to fill it up with diesel, and then start them again. I spent about an hour looking at when it would run out and what have we got to do then. The bigger problem was going to be getting Diesel across the yard from the fuel pump to the generator, to find a utility to use to do it, which again hadn't been thought of. Everyone on site had always assumed that the generator would run long enough for the electricity to come back on, and in this case it did".*

> *"Internally the DCs have back-up generators which give up to 8 hours cover. These are subjected to live tests. Site managers make the decisions about freezer access etc. and about scaling down operations, depending on how long the outage is likely to be. But the DCs are dependent beyond the generators. Material handling equipment is electronic. Once the batteries in the equipment go flat they are out. Without electricity you would be limited to hours of daylight. Warehouses are gloomy, normally they operate 24 hours per day. You would be limited to two shifts in the summer and one in winter. Similar problems in the yard outside, you would not want to work without floodlights".*

> *"All the big sites have generators. It is part of the BC audit, as is checking that they work. They do trial runs with the generators. There will be 5-6 different audits per site, they are very big sites for food. The chill sites must be kept flowing. These are handling over 400,000 cases per day, but only if the floor is clear. There are deliveries to stores day and night".*

> *"Most sites have well serviced generators and back-up fuel supplies…In the long term the company would have to do what others do and work with local authorities. It is not going to stock pile fuel and equipment 'just-in-case' because of the low margin nature of the business. There are generators at sites, but they have failed. We had a good news story where a power company cut a cable which could have interrupted distribution [for medical supplies]. The generator did not work, but the back up plan did!".*

However, one of the Industry Associations was at pains to stress that their own research suggests that in respect to power provision, the companies interviewed here are not representative of the wider industry base, even in frozen food distribution. It had looked at the implications of electricity/energy shortages and sent its members a comprehensive list of generator suppliers, urging them to put dormant contract arrangements in place now. There would be a cost penalty, but the precautionary measure would likely pay dividends in an emergency.

> *"Some members have considered this scenario, some have taken action, some have not. Around 10% of UK cold storage sites have generators. The trend is towards consolidated bigger sites. The biggest have full generator capacity, some can tick over. Most have plans in place to close the doors in a black out. Cold stores will usually survive if locked up. They usually operate at -25. The shops -require -18. The trucks are the weakest link in the chill chain, they will keep food frozen for a week. If the cut was a short-term US-style brown out, then they'd be OK, but if it is a something that downgrades the national grid for months, e.g. terrorism then there are no recovery plans in place. It comes down to prioritisation by government…Those who cannot afford full on-site back up energy supplies should consider putting a dormant contract in place with a supplier, if the power cut is widespread or sustained everyone else will be trying to hire generators. Question the supplier to see what their allocation policy might be in times of peak demand".*

The responses of food processing companies regarding back-up power at DCs was certainly more mixed than the retailer's responses.

> *"The DCs are run by a 3PL, a single contractor, we are their major customers. The whole business area is chilled distribution, we could not allow them to fail".*

> *"Generators would keep the lights on in the distribution centres and for low bay operations, but the big cranes are too high a loading for the generators. In some ways a major power cut is easier to handle than a local one. Everybody is affected in some way. We plan to have orders back up in 12 hours, delivery in 24 and cash collection in 7 days. Cash collection is not the top priority, the company will get paid".*

> *"The company has 2 distribution/dispatch sites. If the National Grid goes down it's 'candles to a man', the docks need power so then it becomes a Health & Safety issue".*

The issue of wastage did come up frequently in discussions with the retail distribution managers and the 3PLs, but most felt that the spoiled fresh/chilled and possibly frozen produce could be dealt with effectively.

> *"If we lost power and the freezers there is an issue about waste disposal for some lines, because of the regulation on disposal of animal products. In practice you wouldn't formally dispose of it at first. You would stick it in one corner of the warehouse or in the yard, because once it's gone*

and once your insurance assessor has written it off, you stack it in the corner of the yard, until someone comes along and takes it away".

"A wide spread power outages would mean that we could not freeze waste food. This is sometimes bagged up, labelled and temporarily stored in back-up freezers. Widespread power outages would prevent this, so it would revert to the crisis management team".

4.3.4 Paper-based picking

For most companies paper-based picking at the warehouses was not an option without notice, but the retail/wholesalers and 3PLs all agreed that simplified priority line systems could be brought in to maintain some flow of goods to stores. The assumption was that these would centre on a relatively small number of top-selling lines. One retailer provided a list of its top selling lines for November 2005 for inclusion in this study, to give an indication of which product these might be (see Appendix C).

"In the DCs we have paper-based contingencies but need advance notification to activate them. We could not cope with a sudden withdrawal, but we could pick off paper with notice of around one week. Could use a paper-based back-up system we have for if the warehouse picking and tasking system for truck mounted and wearable terminals fails".

"In an emergency we would identify the top 20-30 lines. As long as the manufacturers of essential items were working we could go for essential lines".

"Some sites could run on paper-based systems, some sites are less automated than others. In an emergency situation you would abandon the system and do broad picking. We could get food to the supermarkets, but we'd abandon management control on what goes forward. We would go to standard pallet picking".

"We could send a basic order to everybody. In the warehouse you could say, 'right we know that it's this set of lines, and we've got a list of it here and we send somebody out with sticky labels and we go and mark out every pick location. Then pick one case from every location that's got a yellow dot on it'. Intelligent people could put together a list with our retail colleagues of what to send to store, the top selling lines. You would do it without paperwork. It wouldn't last very long because your stockpile would disappear and you'd have to have people driving round the warehouse saying 'where is the next pallet of Coke?' because we haven't got the computer to tell us. You're back to people using their eyes. Perhaps we should have an emergency file that's got 500 yellow labels and instructions for one or two standard orders for stores, but we haven't got the resource to do that now."

4.3.5 Loss of power to the manufacturers: electricity and gas

ENERGY SHORTAGE?

"Energy experts say that the risk of losing the energy supply is less than 0.5%. It is difficult to justify the business case to do something based on that. We are looking at gas and electricity. There is sufficient supply, it depends on how it is managed. The company has an uninterruptible supply. But it is a Category 2 supplier (below the emergency services) so would be last before the domestic services to be switched off. Bakeries and flour mills would have a better chance of staying up than product areas like curries or sauces.

Local failures do happen around specific sites, but they only affect a single site, not the overall continuity and profitability. There is a very low probability of losing power to the other sites. The risk is around price not availability. There is another debate about price/profitability of bread production".

Some food manufacturing sites (including ingredients and poultry rearing) are vulnerable to disruptions to power supplies. The majority of manufacturers use a combination of gas and electricity to power plants. Some, but not all have multi-fuel or back-up arrangement which allows them to run independently in 'island mode'.

> *"Most of the time we could run in own island mode, we usually produce surplus power and sell it to the National Grid. We only take from Grid during daily maintenance…Power generation is driven by gas but can switch to oil (multi-fuel). We have several thousand gallons of oil on site so would be fine for a couple of weeks working at a reduced rate. A gas shortage in the short-term is not an issue, we can switch. If we lose a turbine it pulls in power from the Grid. We used to have a problem if a turbine or boiler tripped out. It could create a domino effect and black out the whole site. Over the last 18 months have put in an electrical load management system to have managed cut-outs to protect key parts of the site. We have capital equipment (e.g. a crystallisation plant) that if the power stops for more than 5-10 minutes we have major problems cleaning out and getting it going again".*

> *"Most plants have dual power sourcing for a limited gas requirement and electricity, and they are backed up by oil supplies in some circumstances. They are not that likely to be vulnerable. Without a controlled shutdown there would be waste product, but no capital equipment damage. Steam generation capability would have immediate effect. If it was at one site, it would have a limited impact on the business, and some sites would be more quickly affected than others. Head Office have generating capacity for critical activities and processes e.g. orders, logistics and finance, plus we relocate critical functions within half a day. We are always looking at upgrading facilities e.g. generators being upgraded at renewal. On a hot day the*

buildings would become uninhabitable in 1 and a half hours. It's a Health & Safety issue".

"We are looking at different fuel options, gas, steam and electricity. Electricity has limitations. We have mostly dual fuel boilers and we use whichever fuel is priced best. We have some self generating capability where we could run on diesel to keep safety critical stuff running, to avoid explosions with boilers etc. Most factories are air conditioned and you need to maintain the temperature in a factory and cold stores. We could not support the whole operation in island mode. The cost of having emergency generators for everything is prohibitive. We used to have exemptions for power cuts, so were never affected in the 1970s. We've lost that exemption, only hospitals have it now".

"Anything prolonged…we would be stuffed! Everywhere - except our site serving the South of England - has back-up oil so can switch from electric. The plants could go to full Island Mode. But the oil storage capacity is not that big so would need regular refills. Not sure how long we could run. The depots are electricity dependent with no back up generators, but lots of deliveries go direct to store. The company has priority status for energy and fuel strikes, after the emergency services and we have done a lot of work to minimise energy use (environmentally driven). Different plants use different energy requirements. New plants are required to review energy usage and prove that they are being most environmentally efficient and friendly, which is forcing an examination of policy. A big grid failure would halt operations. A direct competitor had this in the Norwich area. They were out for 3-4 days".

"We have LPG and heating oil for bird rearing. It is very critical to bird welfare that the heating is very carefully regulated. If the gas supply wasn't delivered (no mains supply) we would lose birds".

"Flower milling has a very heavy power requirement and needs to be very consistent. Power is the company's 2nd biggest area of spend. Power tends to be gas or electricity, not oil powered. The requirement could take up the output of some of the smaller utilities in their own right. It is very susceptible to any variation".

"We are totally dependent on the National Grid supplies. The company got rid of its secondary boilers, but has back-up light fuel. Both were are being shut down because of Health and Safety liability and environmental reasons. We are going to uninterruptible gas supply instead. We used to have 48 hours back up of fuel oil, but the storage tanks are now used for the sprinklers. It was a business decision. We also got rid of 2 back-up generators because of the maintenance. We did consider CHP, combined heat and power generators, but the tax breaks were insufficient to make the business case. If we were operating but the big supermarkets were shut because of power shortages, we could have problems because of lack of storage space at manufacturing sites".

"We have a UPS for IT, but the computer would be the only thing you would be able to run without electricity! We use electricity and gas, but have no emergency cover for anything other than lighting".

"Have UPS for IT , but not for the main plants. All our power supplies are electricity and non-interruptible gas. If the power goes out for as little as 30-40 minutes, the plant shuts down, losing 6 hours production. We can lose between 40-60,000 loaves. The company has no back-up power facility for sites because the power loading is too heavy. Our main competitors are the same. Have some second power lines to enable people to clear the ovens but not to run them".

4.3.6 Paper-based working for manufacturers

Paper-based working creates different challenges for the manufacturing companies. Payment systems are certainly not their primary concern, but replenishment matters. Some were confident that they could make paper-based systems work and had tested them, other would attempt to do so, but had little faith in the effectiveness of the outcome.

"Teams have looked at every aspect of IT failures. IT contingencies assume it would be up again in 48 hours. There would be some impact on customer service levels but the business would keep going. We have manual procedures to fall back on and these are tested. For receipt of orders, all the major retail multiples use EDI. Orders for the industrial sector are mostly manual order entry. Business-to-business is getting to EDI very slowly. Logistics planning could definitely go to paper-based. We have just done a total review with nominated people to manage manual implementation and resource requirements".

"Could get by on a basic level day-to-day including planning, but think that a paper-based system is not workable. The plants are not very IT integrated. We have quite a bit of shop floor data capture and RFID. Which could be replaced. We don't have SAP here, just an old system".

"Could we go to paper-based working? No. Not at the moment. We would struggle and could likely still run operations, we could make things, but there would be problems over the extended supply chain".

"Key thing is getting orders in and product out. The company is quite practiced in getting manual orders in. Get electronic orders from the major multiples so have a fall-back option to duplicate last week/yesterday's order. We still take quite a bit of telephone ordering via the call centre. There's a formal requirement for B/C is in the call centre contract. Can do product manufacturing decisions manually (usually automated)".

A WORST CASE SCENARIO?

"If the there was a widespread power outage the company would effectively come to a standstill. The cost of generating sufficient power to continue production of our most important lines is prohibitively expensive, running into tens of millions of pounds. Without the ability to manufacture and condition finished goods, there is little point in continuing with administrative functions.

The largest site has 4 power feeds coming in. When power was lost from part of the site some staff just migrated to other offices on site. But lots of people still think that BCM is about relying on experience to muddle through. They don't even think about telecoms and computing. The two main centres have generators to keep power going to computers. At HQ it could keep going without lifts, providing that diesel supplies were sufficient. Factories could prevent damage to capital equipment, but not maintain production.

At biggest production site the power and cooling is not run from the National Grid. The heating and cooling system needs a power feed in from the mains, but can then generate all the steam required for the manufacturing and around half of the power needed for cooling. Heat and cooling are needed for the hot and cold system, but it cannot operate totally in island mode. At the time the decision was taken it enabled the company to save around £50K. It could cost half million now to enable it to run on island mode. In an emergency there are 4 large generators on site to keep the contents of the pipes liquid.

The site load is approaching maximum capacity for the local substation so would require major capital investment between the company and energy supplier to increase capacity.

Rolling power cuts would stop operations very quickly. A single stoppage is OK if they allow a controlled shut down, but not sudden stoppage. We already have contingencies in place to seal cold rooms. This is essential. If the temperature is allowed to rise then the permafrost would thaw possibly damaging the structural integrity of the building.

The company's oil tanks have not been maintained and outsourcing agreements have run down oil stocks. Current provider contract allows for termination if the supply is interrupted 3 times in a year, but that doesn't help production.

We are looking at reliability of the gas supply. Gas is the primary energy source for manufacturing, and current contractual arrangements do allow for the interruption of supply".

Whether fax or call centre-based back-up systems would function for a prolonged power shortage was perhaps another matter. One of the biggest problems seemed to be that the companies no longer had the staffing levels to handle paper-based working for a sustained period.

> *"If the IT infrastructure is assumed to be OK, we'd be OK. Our service suppliers have generators. The issue would be could we use it? If it was a local outage we could use bakery sites elsewhere, so we could in theory do displacement planning. We have no actual plans... If you lose EDI it becomes a major problem for the big retailers. They don't have the people to do that manually. We could go to fax, but it would be a nightmare. The company handles 400,000 orders per year and many order lines per order. More than 70% of orders are received electronically. Manufacturing and warehouse picking lists are also automated. ...We don't have sufficient staff to return to paper-based systems either, but we could go to reduced product range and standard order e.g. volume and mix. Volume by store is predictable".*

> *"We prepared for paperless with Y2K. We made the mistake of investing heavily in Y2K. It didn't help, but has since been useful. We could run non-processing business on paper, but not the manufacturing site. We are getting less and less able to do this. We've not enough manpower. If it was a total power outage, then definitely not. Shut downs would mean changing the manufacturing levels".*

For some, paper-based systems were an option they had decided not to contemplate. They were confident that reliance on effective IT support with non-EDI back-up options would survive loss of the IT system.

> *"A paper-based system would be the wrong response. Our IT systems operate at the European level. They have duplication and location separation. The systems are very resilient. It was not so 18 months ago. There is no absolutely no reason why we couldn't go to paper-based, but efforts are directed elsewhere and would slowly grind to a halt. More and more of the business is done electronically so it would be cumbersome. We'd be principally concerned about business-to-business working".*

In addition, several food processing companies mentioned dependence on traceability management systems as an inhibitor to paper-based working.

> *"Beyond 24 to 48 hours we would be in difficulty. The sheer volume of transactions and the lack of staff would bring us quickly to a halt. Product traceability is a major factor, for legal food-safety purposes. We use a totally integrated SAP-based management system".*

> *"We are a US owned company so we have SOX to think about. Traceability and compliance would be big issues. Companies are becoming more reliant on EM128 systems for traceability, so manual systems would be a problem. There would be fears about whether you*

could prove to the shareholders that transactions had been performed with appropriate diligence and control in place".

4.3.7 Loss of power: importers and produce suppliers

Suppliers of key foods and ingredients that had no production facilities in the country naturally focussed their efforts on distribution, Head Office functions were non-critical or could be managed remotely. Traceability remained a problem.

"Headquarters are non-essential to operations in the short term. HQ staff would have to operate from home (assuming there was power at home). The company has done so much contingency planning for IT, it doesn't plan for paper-based working. But all things are possible! There are back-up generators at the NDC, for IT, cold stores and lights. How long they would work would depend on fuel stock on site, and it is estimated that this would be up to 3 days. Fork lift trucks are battery operated".

"We have no generators here at Head Office. Not sure about power to DCs, don't think they have generators. Would relocate the Head Offices from London to our IT service provider's site along the M4. It has a generator. Distribution is outsourced and most critical operations could be run from our Head Office in Europe, but the problem would be getting information to customers. Could if needed go to paper-based working with phone and fax – we have forms ready to use".

"If the office was out for a few days, it is not too much of a problem. All the IT systems are backed-up off site. If there was an issue at a farm, there is a contingency plan built into Farm Assurance standards, this includes back-up power supplies. Assume processing factories would have generator back-up. We could keep milk moving around the country. We could revert to paper-based planning if necessary. At farm level we could use previous collection data to average. The dip-stick option is not as likely as a few years ago. Data transfer, validation and payment is a big issue for the farmers".

"The company used to have exemptions from power cuts in the 1970s when infant formula manufacturing took place in the UK. During the 3 day week in 1970s, the company had power 5 days a week for formula. Not sure what the situation is nowadays for Ireland".

"Would lead to short-term failure to supply and a significant loss of temperature controlled stock, but a very quick recovery. Would go to direct delivery from port. We have generators to power part of the site, but don't know for how long… We could use paper-based systems because it has happened in the past. SAP implementation resulted in a few days interruption. We would continue to supply and sort the paperwork out later. We could always get product out of the door. The big problem is the position on traceability. We have to be able to document the source back to grower. That would fall by the wayside".

4.3.8 Loss of power: packaging

The packagers could keep the computer systems up and go to paper-based working, but production would cease if power was lost.

> *"If we lost electricity – a major failure- it would be a very big problem. We could not produce. The power draw is too huge and costly for back-up generators. We could put them in, but it is so costly there is not a business case to do that. If it was a widespread outage everyone would be going for generators so you probably wouldn't get one. We have UPS for computers and could go for about one and a half days before there was a major problem with that. We could definitely revert back to paper-based systems".*

> *"The company could run with difficulty on paper-based systems. There are enough 'old timers' around to do this and the plants could run on manual controls. The power supply is mostly electric, or gas and electric, but couldn't run in island mode. Production is very vulnerable to fluctuations in energy supply. The company could not switch to oil. Electricity and gas supplies are interruptible, would force short-term working and capacity constraints mean the company couldn't make up the shortfall".*

4.3.9 Rolling power cuts

Back in the 1970s food manufacturing, retailing and distribution was more 'local for local' than it is today. Now a manufacturer might serve the whole of the UK (and much of Europe) from a single site, while distribution centres might service all stores within a 150 mile radius. Most retail DCs do have at least some emergency generator cover, but their operations and delivery scheduled could be very quickly and severely disrupted by store closures. The DC's would then rapidly run out of storage space for undeliverable loads, which would reduce the throughput at DCs. Normal contingency measures for loss of DC operations (e.g. direct to store delivery) may not work in this instance. The retailers and 3PLs did believe they could work around the problem, but they would require notice.

SCHEDULING FOR ROLLING POWER CUTS

"For rolling power cuts, deliveries could be rescheduled as long as there was some notice of the power cut scheduling. If is too dark to unload you would have to go to daylight deliveries. Schedules are planned very carefully for major events (e.g. Christmas). If a customer has no power there may be a problem. If they were unable to deliver to stores, quite quickly they would have lorries full of stock and warehouses full of stock.

It would need very careful communications to synchronise deliveries. It may possibly drop to half usual efficiency. There is not a lot of flexibility e.g. to change shift patterns etc. It is possible to effect step changes in volume e.g. a customer's warehouse at Bristol can go from around 1.3 million cases to 1.8 million but we need to plan 3 months in advance. Money talks, people would come in if they were paid well for it. We are a big beast, like super tankers, we take a long time to change. Communications is the key".

4.4 Loss of water

Water was the only other essential service mentioned by interviewees throughout this study. Loss of the mains water supply would pose a problem for retailers and wholesalers because of hygiene requirements.

> *"We have had to close branches in the past e.g. when there was a disruption to the hot water supply".*

Some of the food manufacturers, including the bakers, needed plentiful supplies of microbiologically safe water. Some companies had secured their own supply from bore holes, others had not been so lucky, since necessary restrictions governing water extraction limited the options available to food processors and even bottled water companies. These restrictions have tightened over time.

> *"We have no bore holes because of the difficulty in getting water extraction licenses".*

> *"We are very dependent on microbiologically safe water. Bread is 60-70% water. Have 20-40K gallon tanks on site, these are regularly checked. Any contamination would be a huge problem".*

One of the transport companies had been involved in the distribution of water during a shortage in Yorkshire some years ago.

> *"In the past the company provided tanker fleets for Yorkshire Water. The company moved many of its tankers up from the South to the North of England. The tankers were from the 'Special Products' division. They are mostly used for petrochemicals, but they are used for other things. They were cleaned out and used for water"*

The option to use large amounts of bottled water to replace mains supplies to the general public was not feasible. Bottled water does not meet the regulatory requirement for potable water - the Drinkable Water Standard - so technically cannot be used as a substitute for potable tap water. However it was regarded by some of the retailers as a practical fall-back option to maintain hygiene standards.

4.5 Disruptions from sickness and infectious disease

In May 2005, when the interview schedule for this project was drawn up, a question on potentially life threatening contagious diseases was included in this study, citing SARS and 'Bird Flu' as examples. The question was originally included to see whether companies had given any thought to the possibility of a significant reduction in the available workforce or movement restrictions from quarantine. Some companies e.g. those involved in livestock rearing or the dairy business immediately related it to their experience of Newcastle Disease or Foot and Mouth Disease in 2000.

> *"Notifiable animal diseases such as Foot and Mouth Disease or TB in cattle would disrupt our business. During the Foot and Mouth outbreak we could collect milk until the herds were removed. Milk collection kept*

going even in restricted areas…It was a logistical nightmare. Shifting to the alternatives is the most difficult part. We had procedures in place. These are being updated by Defra. The trade body Dairy UK is working with them".

However, this question also captured the food and drink industry's unfolding preparations for Avian Influenza and human pandemic flu. From early January 2006 onwards, all those interviewed were already aware that H5N1 was out there, though many were still unaware of the potential implications for their business of a human flu pandemic. Because this was an evolving situation the participating companies were all approached a second time for updates on pandemic planning in May or June 2006. These have been incorporated where appropriate and dates have been added to the information presented on this subject.

4.5.1 H5N1: Avian Influenza

Back in the Autumn of 2005, only those organisations involved with poultry rearing, or with business interests in the Far East, appeared to be aware of the direct threat H5N1 posed to meat supplies. The retailers and wholesalers were the first cohort to be interviewed for this research (August 2005 – January 2006). At the time only one of the large retailers was actively monitoring the spread of the H5N1 stain across the world. The retailer had already encountered disruption to sourcing from Far Eastern suppliers as a result of earlier outbreaks and subsequent culling.

Companies with poultry rearing, meat processing as well as retail own-label interests looked first and foremost to the impact on production and the need to develop bio-security, to reformulate products and arrange alternative sources of supply. The largest retailers were actively engaged in policing bio-security measures.

"Last Autumn we had nothing specific in place for Avian Flu or a pandemic. Now we have plans for both. Avian flu planning is extremely detailed and has swung into action twice so far with good results. I had experience of this in my last post. They had to clear shops of chicken in the Far East. All chickens were killed. Because there was no chicken they had to get substitute products and support the chicken suppliers as well as increase stocks of fish etc. Switching from one meat to another happens sometimes. Following a recent 'Dispatches' [TV] programme, people switched to organic. The first thing that would be affected in the UK with Bird Flu is the organic free range produce". [Sept 05/June 06]

"We work very closely with suppliers e.g. to check bio-security measures are in place to protect staff etc. and we're making sure they have sufficient information. For new suppliers, when we start doing business with them we do a capability review, that covers capability to supply, capacity etc. We don't ask for business continuity as such".

Some of the other retailers/wholesalers agreed that the policing of bio-security was desirable but the practicalities were sometimes a problem.

"We do have product sources in Indonesia, but there are problems with going there due to kidnap and murder" [Aug 06].

A representative of an industry association confirmed that its retail membership had plans in place for a disruption to the supply of poultry products and a working group had been established within the association.

> *"With Bird flu, the issue is supply of product. Don't know what the actual contingency plans for the members are, they would deal with this via the supply base. e.g. If Norfolk went down where would they source supplies?... The chilled ready meal sector would grind to a halt if Thailand and Brazil were both hit by H5N1 or were subject to import bans at the same time. It would affect any processed chicken product. It would wipe out whole sectors of the industry and would put the price of alternative protein (e.g. Beef) through the roof. It would definitely affect the catering and food service sectors. The volume of chicken we eat and volume of chicken imported for these companies is phenomenal".*

The food processors that were involved with meat products admitted that there was uncertainty over what the arrival of the H5N1 in the UK might do to demand as well as supply. A minority of the ingredients suppliers made deliveries to or collected from farms. They were aware that farm deliveries could be viewed as 'risky' by employees, suppliers and trade unions.

PLANNING FOR 'HIGH RISK' WORKERS

"If we do get infected, how do we protect all our employees? And what if they refuse to work with 'risky' poultry? Then there's 'danger money' or 'adverse working conditions'. It is all being actively planned. We are always battling with ignorance - as soon as an ill-informed journalist appears on TV there's a problem.

We had the media outside the company on finding the dead swan in Fife. The T&G union rep was being interviewed and demanding flu jabs for all staff and their families. All employees were offered flu jabs last year, but that wouldn't help.

We've looked at personal protection equipment, there is enough manufacturing worldwide so were not too worried. We checked again last week [Early April], availability is getting tight and prices were rising. We have offered (ordinary) flu jabs to people and are looking to buy a stock of face masks etc. It's a bigger issue with suppliers, they are getting worried about delivery or staff who drive buses. We are having a dialogue with suppliers and their employees".

> *"We have a strategy for Bird Flu which assumes the bird version only… It is a big issue in pet care, they are currently reformulating pet food to reduce the poultry requirement" [March 06].*

> *"It has been recognised, but nothing in place yet. We would consider the impact of Avian flu or a pandemic on farm labour i.e. are cows milked and are people looking after the livestock. Will use our BSE/FMD experience and reduced manning. We could operate on a skeleton staff, with fewer people".*

"The quality assurance manager has started looking at this, it was brought up at a risk management meeting last week [April 06]. Have had discussions with suppliers (e.g. packaging from Turkey) about whether this is an issue. We have ordinary flu jabs and do lots of deliveries to farms (molasses). For FMD had to have suits (disposable overalls) and disinfectant sprays for drivers and vehicles. We are stocking up on all equipment in case of bird flu. During FMD the army contacted the company about pallets for bonfires to burn carcasses…If we had a high level of sickness we would prioritise lines (reflecting contingencies in place for industrial action to keep going). Economics of plant require production across the product range".

"We would be waiting on Defra instructions for Avian flu. The website will only be used if credible and factual official advice is available. We've looked at bird migration re H5N1. Chile and US both had Avian Flu. They had it in the US from migrating birds. Bio-security is in place, but there is a credibility gap. You can't control the media but we do need some sensible approach to reduce panic-causing measures. e.g. the headline 'Bird flu in Turkey' [the country] resulted in a drop in demand for turkeys!...If Avian Flu arrives we don't know what it will do to demand. Its OK having contingency plans for Defra in place, but we don't know what the impact would be – e.g. willingness to accept product from Eastern Europe. What if retailers are reluctant to place firm contracts to be supplied from outside the UK, because of the perception that it is safer?...If the breeding birds are affected there would be a long lag to rebuild the breeding stock. It would take two generations. The British Poultry Council have dispersed breeding stock just in case. We would then have to import".

"The general attitude towards contingency planning has changed. Avian Influenza (AI) planning ratcheted up around Christmas. Some felt it needed to be raised more. As it arrived in Europe planning accelerated for any number of eventualities. That included operational issues in terms of agriculture, welfare, operations planning etc. Everything is AI focussed. Pandemic is on the back burner for the moment. Senior people are preparing to work from home. A lot of labour is transferable between sites, partly because of the high use of migrant workers, it gives the company some flexibility".

4.5.2 Pandemic flu

One retailer with Far Eastern experience was actively monitoring for any sign that the H5N1 virus could be mutating into a form that could readily jump the species-barrier. In the Autumn of 2005, the other retailers and wholesalers were largely unaware that H5N1 could conceivably combine with a human flu virus to pose a direct threat to public health. The interview process flagged it up and human pandemic planning was subsequently added to risk registers. However by the completion of this project in the Summer of 2006, preparations for a human flu pandemic were well underway in the biggest supermarket chains and to a lesser extent in the wholesale and smaller supermarket chains. Some areas of operations had already received specific

consideration. For example, the viability of home delivery services was being examined. Both of the superstore operators raised the issue of the role of in-store pharmacies, whilst all the retail groups were concerned about staff welfare and staffing levels, especially in the event of school closures.

> *"The company has had experience of Avian Flu and SARS in the Far East and would implement plans to look after staff and customers, we are also looking at the impact on the trading profile and dependencies on others. Likely to identify key (service) dependencies on suppliers, taking on the lessons learned from Gate Gourmet[5] and single sources of supply e.g. transport, cleaning arrangements, waste management and security. Security is provided by a third party contract security company. We might have to lower our guarding levels and make a decision about whether it was safe to operate…For a pandemic the company would likely enforce its bulk buying policy on customer purchases for key products (e.g. bottled water) to avoid individuals hoarding. The company has a business policy linked to resources for home delivery. It would depend on the effect on store traffic, but we would expect a surge in dot.com usage. Initial thoughts are that a shortfall of 15% staff would result in the service being suspended, but we would try to maintain the service for as long as possible"[Autumn 05/May 06].*
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> *"The company is planning for a flu pandemic and looking at impacts on a number of areas in the business, based on an 'impact/effects-based' approach. We are looking at the impact of significant staff absence and at key areas e.g. Pharmacists are key people and could be a single point of failure in the filling of GP prescriptions. The company has held workshops for pandemic flu and has a regular cross-functional team looking at the issues. An Exercise to model the impact of a pandemic and develop our responses is planned for July" [May 06].*
>
> *"There are 400-500 colleagues in an average store, and around 1000 in a large one, and around 50 people on the check-outs. There is a huge potential fall out for the stores if the schools were closed. This is a highly operational environment so this would be a problem…If there was a 1918 style pandemic then inoculations would be needed for food distribution staff. 9 million people pass through our stores in a week. More than half of the UK population pass through one or another of the Big 4 retailer's stores every week. There would be questions too about whether the government would want to use the in-store pharmacies to distribute medicines and act as health centres…Turning the problem on its head the store network could inoculate and distribute drugs much more rapidly, using the stores as inoculation centres. They have drugs holding and handling facilities and regularly do health checks and have opticians in some stores. The centres already do flu jabs in-store" [Autumn 05].*

[5] Gate Gourmet refers to an industrial relations dispute involving the sole supplier of in-flight ready meals to British Airways, which ultimately led to the grounding of all British Airways flights for several days in the summer of 2005.

"In September 05 the company had no policy for epidemics. What would likely happen is that the local health authority would be involved and we would follow their advice. The standard processes would likely come in – i.e. 'don't put yourself in harm's way'. The company has since moved ahead with pandemic planning. We have a plan formulated, but only to a certain point because as time progresses the requirement would change. Normal procedures are OK to the point where it jumps the species barrier. Rather than go at a 100 miles per hour to plan for Spring 06, we are watching the World Health Organisation scale which is at level 3 and has been for a year. If it moved we'd look again so the plan would be current and relevant. Every facet of the crisis plan has been allocated to an individual so a plan can be put together quickly" [June 06]

"For pandemic flu planning we have reached third base. We brainstormed the problems for a full day and have had the first cut at planning. I now have the unenviable task of trying to finalise it"[June 06].

CONFLICTING INTERESTS AND UNCERTAIN ROLES

"The company has dual, but sometimes conflicting responsibilities in an emergency. One is its role in feeding the population, because of the size of the company's market share. The other is its role in relation to its 140,000 employees to whom it has a duty of care. I've been concerned for some time about the implications and appropriate response to a major terrorist incident such as a bio-attack or dirty bomb, resulting in the evacuation or quarantine of some or all of a city or centre of population. I'm concerned that I've not been able to get any clear guidance from the government/emergency planners on what the retailers' situation and role might be. Similarly he had been unable to illicit answers to how staff might be protected and whether drivers would be asked to go in and out of quarantined areas, or perhaps only allowed to make one-way trips. In such circumstances the company would likely have to resort to volunteer staffing, but this would still require suspension of legal liability and everyday duty of care legislation to proceed. The retailers and suppliers would also need to be told which product lines should be given priority e.g. a list of the top 25 lines so that resources could be focused on maintaining supplies of these items…I believe plans were made by COBRA, but the retailers have not been informed of these. I assume that that would be up to the local authorities, in which case we are doomed! There had been some communication with retailers about 3 years ago, but have had nothing since that made any real sense. There had been a policy meeting at the offices of one of the largest industry associations and M15 had convened a meeting. If Government waits until there was an event, then it would not work. We have to get people in, get food and fill vehicles. The company does not carry huge stocks of key food stuffs" [Autumn 05].

A spokesman for one of the industry associations representing some of the bigger stores echoed some of its members' concerns, including the likelihood of whole store closures.

> *"I was in Singapore during the SARS outbreak so have some knowledge of SARS. Defra did put some advice forward about pandemic flu, but members were not sure what to do e.g. do masks and plastic gloves help? Not that much…Even if there are contingency plans, they won't know the detail, until the pandemic hits - scientists can't produce the model. It won't be known until it arrives e.g. mortality profile. A huge proportion of the UK population work in retail. Large stores are underpinned by part-time labour and young mothers who are likely to be either looking after sick children or at home because the children are not at school. It is likely that if a store has someone fall ill, a high proportion of the staff will not report for work. Within the retail industry there has been a big debate about who are key staff and who aren't. If a pandemic hits tomorrow, industry would look to government for direction – the problem is whether the consumers trust the government. Retailers are trying to predict how you would run the stores with very few staff. Whole store would be likely to close".*

The small independent retailers had not thought about pandemic planning at the time of interview (February 2006), but felt that there was not a lot that they could do about a pandemic. They agreed that they would follow the lessons learned from earlier fuel crises, in terms of taking 'best advice' at the time. They were not in a position to influence stock availability, but were concerned that the businesses would be badly hit if staff were ill. Their usual policy for contagious infections (stomach bugs etc) was that if someone was sick in the employee's household they would be asked to remain at home. Mangers noted that store staff tended to have good immunity, though felt that the issuing of face masks might help. Most of their stores had very local catchments with the majority of customers residing within a quarter of a mile of the store.

A common fear expressed by managers representing some of the largest and smallest retailers in the land was fear of public disorder. One manager interviewed, a former police officer, had first hand experience of rioting:

> *"Once the high street starts escalating people smash windows within a quarter of an hour. People act out of character, it's a pack instinct" [Jan 06].*

All pointed out that their primary concern had to be for the welfare of staff and customers. Convenience stores have a high incidence of violence even in normal times. If public order was maintained convenience store managers felt that in rural areas staffing levels could fall as low as one person per store. In urban areas, the minimum figure was three or four, particularly in inner cities. This would provide minimum cover for till and security, though shelves would not be restocked.

Senior managers from the largest retailers and one of the third party logistics providers made similar points. Again there was the expectation that the police should be brought in to maintain in-store security in the event of a national emergency. The

fear that the Army might commandeer assets or 'take over' transport and distribution at the large supermarkets was also expressed.

> *"I attended a meeting with a major food supplier and a very senior figure from the Metropolitan Police where questions were raised as to whether, for example, police might be positioned in stores in the event of an emergency to help keep public order. I was alarmed by the response which appeared not to take the potential problems associated with the distribution of food and bottled water seriously. I was told that 'police would be in the stores like everybody else. They would be in there buying bottled water!…" [Autumn 05].*
>
> *"In an emergency are the Army going to come in and commandeer our assets and take over food distribution?" [November 05].*
>
> *"For the big scenarios it is assumed that the government will step in" [Nov 05].*
>
> *"If you are into the emergency scenario, how you see things and how you treat people might be different, but we know full well that someone is going to come along and say "by the way you are not going to have this in your warehouse anymore, we are invoking emergency procedures that say that the government is now controlling the distribution of food, we will tell you what we want you to do. If that was going to happen I would say what do you want me to do? Where's the list, what do you want me to send out?" [Autumn 05].*

The 3PLs looked to Government to prioritise food distribution staff for vaccination. Beyond that everyday 'flex' contingencies and the use of agency staff (who are presumed to be still available) remained the default option for most of the of those managing retail distribution in the UK.

> "*A plan is in preparation. It is being progressed with the company's HR department. The company had experience with SARS overseas. It has plans for the loss of a percentage of staff and has the potential to move staff between areas. …Operationally there is a problem that if one person were to go down with such a disease – how would you get the others to come in? Especially if they have children or elderly relatives? There is a duty of care, but panic would set in with the workforce. There is no opportunity to discriminate between local and overseas agency staff. The trade unions don't like it and there is concern that the unions might object to recent immigrants working there, as they may be carrying bird flu. If it was a confirmed larger outbreak people will stay at home or even report sick when they are not. The questions would be what could you buy to protect workers?. Would the government inoculate food logistics workers? Would it look on food and water as essential users? Employees would come in to work if they could benefit from inoculation. If masks were effective, they'd likely accept that. The government should give priority to inoculate <u>key</u> warehouse workers with Tamiflu. In a flu-type emergency warehouse staff need to be inoculated, fed and provided with transport" [Nov 05].*

"If we lost a site because we've got an epidemic, same planning principle would apply. We would serve the stores from other sites, only it would be easier because you wouldn't be actually moving the whole shooting match. Our systems are such that we can divert store orders easily. We have a central register of store risk assessments for deliveries. If the depot gets under pressure 10 stores will be transferred. It's not something that happens live every day, but if they say right, I've got a problem next week because I've got 20 people off with Flu, we can assess how much work that is and say who can cope with that. We can reassign those stores, and the bigger it gets, the more you would move" [Autumn 05].

"Our plan is the same as for strikes. We would carry on and could find agency staff and ask people to work longer hours. Might have to put management staff into operational positions" [Jan 06/June 06].

The low level of pandemic awareness within the food transport and distribution industry was underlined by the representative of an industry association that had conducted its own research amongst members early in 2006.

"The Association did a survey 3-4 months ago. We found one member that had considered it! They had not done much. Their first thought was agency workers! But then they rethought. The study has not been updated. Predictions are for only around 75% attendance at the peak of the outbreak. They had not considered anything other than people being ill, not thought about people being at home looking after the family. They thought that the suspension of the Working Time Directive would provide cover and they could offer more overtime. The food industry accounts for 27-28% of trucks on the road. A big problem is the shortage of truck drivers. The Association is doing some work now with a big driver agency, to look at pandemic or other major problems to see what capacity they have. They have lots of people on their books who only work a few days per month. There is some reservoir there, but it varies around the country. Don't yet know what the regional variations are." [May 06].

The food processing companies, importers and ingredient suppliers were mostly interviewed between January and June 2006. By this time all were aware of a potential threat to human wellbeing from an H5N1-derived human flu pandemic. Planning and provision ranged from careful succession planning and the purchase of special equipment, through to 'watching briefs' or nothing at all.

"There are 7-8 people now working on Bird/pandemic flu within the wider Group. The key issue is succession planning. We have done a lot on Investors in People which has helped. Assessment is being done at managerial level. The company has not bought respirators or Tamiflu, it is considering it, but we are not sure how effective it would be if the rest of the supply chain went down…We recently looked at emergency packs for pandemic flu. Masks had gone up 10-15% in price. We are currently preparing to distribute hygiene messages. We've looked at the Asian sites e.g. Hong Kong airport and have used their guidelines. They

ask 'Have you been near sick people or poultry farms etc?' We will run an education package. We started working on this in October 05" [Feb/May 06].

"The Head Offices don't have a specific hygiene policy. They rely on the good judgement of employees, and it depends on the transmission mechanism…The food factories have very specific hygiene policies. They have to be proactive. We have not looked at all the variables for pandemic etc. We would rely on generic Head Office/operating site level policies and would look for emergency guidance. Have some confidence in our ability to respond and would look to extend our basic framework and then layer on different challenges and issue guidance notes. We are maintaining a watching brief and watching the banking sector. There is a limit to what can and can't be done. It is either too big or too uncontrollable to fit within our risk management matrix. The more the rest of the commercial world has robust plans in place the better it is for us, if the country or businesses are better prepared it strengthens the business" [Jan/May 06].

"Currently preparing and planning for Avian Flu Pandemic. However, the BC Planning approach is generic and accommodates for specific differences like Fuel Shortages, Foot & Mouth, etc. Our approach for dangerous diseases is generally to avoid unnecessary movement to or from sites and to use telecommunications to conduct business, where possible. We would monitor those who have to travel and train them in the use of best practice to avoid the risk of infection/cross contamination. The Chinese operation is currently distributing 'scare' material based on basic hygiene" [November 06].

"The company's first briefing on pandemic/ bird flu has just come out. There is a plan in preparation, but we don't know what it will be yet. We do 200 journeys per week, trunking e.g. Glasgow to Plymouth as well as local" [Jan/June 06].

"Bird flu/pandemic is not specific for bread, but would affect operations. We have a contingency plan and steering team, but don't know about the complete implications of a pandemic. Policy is for supply rather than pandemic…Last week we sent out a note to major IT suppliers asking about provision for Avain/pandemic flu. One has sent a holding statement, we expect to have plans in place for the end of January. The one who responded did so with more than a general assurance" [Jan/June 06].

"Thought has been given to pandemic flu. We assume that essential workers would get vaccines, but don't know" [Mar/June 06].

"The company has had an avian/pandemic flu project since May 2006. The issue has been raised, there would be travel disruptions. We are preparing to issue a notice to work from home. We have many line managers who could work from home. Distribution and transport is outsourced" [Jan/May 06].

"I'm not aware of anything established for a pandemic, we've not gone that far yet. I've heard people talking about possible absenteeism of around a third. That would definitely disrupt operations. The US company would probably overreact and put in a blanket travel ban within a week, we saw that after 9/11" [June 06].

"We do all kinds of health screening for people who have been sick etc. and there are procedures in place to prevent ill people getting back into the workforce… Not aware of any formal plans for a pandemic…People look at that kind of thing with a degree of "cry wolf" …We may do what we do at Christmas when all staff go to help out in the pack house to keep product moving" [Mar/May 06].

"If there was an outbreak of Avian Flu near a site what would we do? Don't know – shoot birds! We have no pandemic planning yet" [March 06].

The packaging companies had no formal planning in place. Packaging is a low margin business and whilst keen to get the critical role of packaging workers acknowledged and their wellbeing protected, the companies were also mindful of the costs of contingency for an exceptional event of this kind. With retailer consent they would follow several other category producers and switch to a reduced range, which would go some way to accommodating reduced manpower levels.

"We have no pandemic or Avian flu policy. We could supply the market if a site lost 25% of staff from one site. We could produce around 85% of requirements from other operations. We'd be OK if it was a localised problem. If it was a national problem we would short the market by around 10%. Would likely simplify the product e.g. 2 litre [milk] bottles and maybe stop producing some smaller volume lines".

"Any problem Europe-wide (e.g. a pandemic) would be a big problem for this company. Would key production staff get Tamiflu? The company would have a problem with absenteeism. Older workers have taken early retirement so most workers in the company are of family-rearing age. The work is not very labour intensive, but still need 3 shifts 24 hours per day. We have to respond to customers and could only go to utility lines if customers directed it. Within 24 hours we could produce a basic utility line if the customer decided to go to a reduced range. It would mean less choice for the public, but they would take whatever was available. Companies have a duty of care, but to whom? Extraordinary precaution costs will have to be carried by someone. Who is going to pay? Government won't and the supermarkets won't".

PANDEMIC PLANNING FOR MILK

"There is no formal policy yet, but the HR Director is looking at this now (April 06) Pandemic/Bird Flu is No.11. on our risk register. We have looked at it in three ways:

1. Panic buying.

Everyone will panic buy milk and stock up so there will be a big surge.

2. Demand fluctuations.

Then there will be a big drop because no one wants to go to the supermarkets and the schools will be off. When the kids are at school much more milk is consumed. It is counter-intuitive, but parents like to make sure children have had breakfast before they go to school. There is also some seasonal fluctuation for the South West, when people leave the cities to go to the South West for holidays. This is not a big issue. Eventually it will settle down.

3. Staff Availability and Protection.

The biggest issue is staff availability and drivers, and their protection. There have been discussions about getting dairy workers on a priority list, but they will probably not be. Dairy UK is doing some work. It is when the schools close that we would have a problem, but there are very few part-time workers in distribution.

Supply Chain Contingencies

We have had internal discussions on contingencies to help supermarkets. One scenario is driver shortages, supermarkets closed is another leaving us no outlets, alternatively going to corner shops not supermarkets. We have explored scenarios, but have no concrete plans. We have talked to the supermarkets about range reduction e.g. one product, one pack size, dropped off at one location. We are talking to our packaging companies too about how they would cope. Running out of bottles might be one issue.

Industry Level Representation

We would look at bird flu and pandemic flu from the industry association perspective. People here work with policy groups and look at what the industry can do to influence policy. It was the same for the fuel strike, to ensure milk collection. These are things that affect the whole industry. There is no benefit in taking a company only approach."

Section 5. Stock Holdings, the Dynamics of the Marketplace, and Government-Industry Interface

5.1 Introduction

This section looks at stock holding policies, the dynamics of supply and demand together with issues of prioritisation, competition and collaboration. It presented the question 'How long could your organisations maintain operations if movement of goods between sites was stopped or seriously impaired?', an eventuality that could be related to at least two of the previous scenarios i.e. disruption to road transport or quarantine. Managers were asked to give an indication of stock levels at store, manufacturing sites and distribution centres. They were also asked what would run out first and whether storage for finished goods or waste disposal problems might halt operations. The section then looks at panic buying patterns, how scarce products might be allocated in practice, recovery times and constraints. Finally it deals with the interface between industry and emergency planners.

5.2 Stock cover at retail and wholesale

The retailers spoke with one voice in emphasising the continuous pressure across the industry to minimise stock holding and maximise availability. One leading company had a target of 10% stock reduction year-on-year, as a proportion of sales. It set a competitive benchmark that the rest of the industry strove to match. They detailed mean average stockholdings but were at pains to point out that stockholdings for 'core' product ranges were very much lower. The boxed example in this section provides details of mean average stockholding for one of the country's leading supermarket operators.

> *"The company does not want to hold surplus product in store or DC if not needed. It has in total around 11 and a half days ambient product in the system (depot and store), but that is a mean average of the total food range. A large amount of that would be forward buys for promotions or events. Much of the stock holding is very focussed. It is not the core range. For fresh produce there is only a day's stock. In-store there is around 7 day's stock (mean average for the total range including slow selling lines like branded soups or olives) which means there is a long tail. 35% of all lines make 80% of volume sales. For most high turnover lines stocks in store are around 30-40% of one week. Most stores get 13-14 deliveries per day. They are very well set up for quick replenishment as long as the lorries are moving. Water is a 'stockless' line delivered direct from the supplier…The company is trying to reduce its overall inventory holding with fewer ranges and going for more cross-docking rather than warehouse racked stores".*
>
> *"I have worked for several organisations in the industry and no-one holds emergency planning safety stock. Safety stocks are all based on lead time and demand variation, so national crisis are 'not on the radar'. Fuel is an exception, but it is easier to hold than millions of*

pounds worth of product on shelf…At the DCs essential items would run out. Fuel first. The company has around 3 days at it DC in the South East of England and around 8 days at the Scottish DC".

"We have more that we should have in the DCs, generally I think on the chilled its virtually nothing because most of it is non-stock. On frozen, it's about 8 or 9 days, on ambient the average is about 15 days, higher in the national warehouse, lower in the local warehouses, but there is also a significant amount of stock in stores as well. We don't deal with that so much anymore. Most bread is delivered direct. We have one chilled depot that does a bread function and we are likely to do more bread in the future but it's still low and likely to be a cross-docked operation, and if anything it's a non-stock. The side of bread that we are involved in is the in store bakery range. A lot of our stores have in-store bakeries, but they come as frozen product and we supply that through the frozen network, but again that's not a huge amount of product within frozen".

"This company is first and foremost a commercial concern. It's main objective is to do as well or better than its competitors. For this reason it accepts that 'boiler plated' planning can have competitive costs and disadvantages…Exceptional '100 year' or long term disruptions are not covered in contingency planning, continuity of supply, or stock cover calculations. These are based on statistical variance of normal demand…The company has no incentive to hold emergency stocks e.g. tinned products near the customer".

"The company is now looking to remove slow moving/obsolete products (10%) of lines. It is likely to carry the same volume of SKUs but looking at rationalizing the range and 'silt'. It is continually looking for ways to reduce stockholding (for cash purposes), but we are starting from a high base. Other cash and carries have high stock holdings to make vehicle fill requirements. You need a continuous trading environment with no disruptions to facilitate lean. It needs and is predicated on a stable environment. Responsiveness is at least cost provided you have the assets (e.g. vehicles). Supermarkets have 1-2 days cover on Coke and baked beans. This company is likely to have 1 week – 10 days. Other wholesalers 2-3 weeks (to justify full vehicles from companies like Heinz)".

A third party logistics provider (3PL) confirmed that stock holdings at distribution centres varied between clients, with supermarkets carrying around half the stock cover (days) of the large cash and carries.

"For ambient they are: [big supermarket] 6-7 days stock, [cash and carry] 15 days, chill no stock for most, frozen is mostly stored in the warehouse with little in stores. Bread, milk and produce are all supplied direct to our warehouses on a daily basis with no stock held".

STOCK HOLDING FOR A MAJOR RETAILER

"The business is moving more and more to JIT. Fresh food would be out first, within 12 hours. The company is better placed on ambient and has stock holding facilities for ambient, could take on a temporary warehouse as happens at Christmas. Store rooms have been squeezed so could not really stock build in the stores or distribution centres. Bread and milk go direct to store. Fresh picks out at the end of each day.

Stockholdings of Essential Items

In total our business holds:

- 1.5 days stock holding of fresh food
- 7 days stock holding (mean average) for ambient food. On ambient the faster selling lines will be down to 2 days stockholding with slower lines at 9 or 10 days.

Stockholding at Point of Sale/DC

The inventory levels are 2/3 of stock at Point of Sale and 1/3 of stock at DC, or 4.5 days ambient food and 1/2 day fresh in DC.

Shelf Life

- Fruit and vegetables 1 – 6 days cook life
- Meat and Poultry 2 – 4 days cook life
- Dairy and Milk 7 days cook life
- Ambient food and drink 12 – 24 months

What would run out first?

- Fuel (petrol and diesel)
- Fruit and vegetables
- Dairy, milk and cheese
- Water
- Soft drinks
- Rice/Pasta
- Canned fish/meat

Key Categories in a non-specific crisis

- Fuel
- Water
- Pasta/Rice
- Canned Fish/Meat
- Batteries
- All canned and dried food

Waste?

There is not the capacity to bring stock in without flowing on to stores and customers. Operations would cease within 36 hours if waste could not be disposed of. Food supply should be viewed as a pipeline. The supplier at one end and consumers at the other – there is little capacity to stop the pipeline in mid flow.

International Trade & Fresh Produce

For fresh produce the UK is relatively self-sufficient between April and October. Between October to April, it is heavily dependent on Europe. If a pandemic strikes and countries close borders it would impact more in the winter than in the summer. There are consolidation sites close to the ports where stock destined for the company comes in, but it is not paid for at this point. There are 7 days – 3 weeks stocks (ambient)".

The smaller retail groups are responding to increased competition from large supermarkets entering the convenience sector. To compete the independent grocers have adopted the same Just-in-Time inventory management practices as their larger rivals. The sole trader explained that he owns a large store with only a small storage area. To maximise sales he has increased the size of the store from 7000 to 16000 sq feet, and reduced the stockroom from 600 to 200 square feet. He holds no more than 14 days stock and works on a 9-day stock turn (mean average). Here too inventory stock levels differ greatly between categories, i.e. the 80/20 rule applies. Bread and milk holdings are only around 2-3 days; baked beans around 2 weeks, soup 6 weeks, while stock holdings for most products e.g. coconut milk would be very much longer. Stock levels of milk are highest on Saturday night (to cover Saturday and Sunday). The store receives 6 deliveries of bread and 6 deliveries of milk per week; daily fruit and vegetables (maximum 2 days); 3 deliveries of chilled and frozen produce per week; and 3 deliveries of frozen to bake in-store. The convenience store managers all stressed that most good stores are increasing the proportion of fresh chilled at the expense of ambient.

> *"Around 40% of my business is now fresh produce".*

> *"Since Tesco Express opened up there is greater emphasis on fresh. The whole sector is concentrating on fresh more and more. It is the main growth area for convenience stores. Growth is around 8% in bread and 10% in fresh. The wholesalers are the same, more fresh and chilled, all leaning down with more JIT".*

Moreover, several retailers made the point that consumers no longer have cupboards full of canned and ambient produce. Like the retailers, consumers have de-stocked. They have moved from ambient to frozen in the 1970s and 1980s and latterly to chilled and fresh. The shift is due to proximity to stores, convenience, ranging, technology and consumer preference. This view was also supported up by one of the industry association representatives, though the indications from his organisation's membership suggested that the exponential growth of the chilled sector may be slowing.

5.3 Competing through lean, Just-in-Time manufacturing

The food processors and their packagers have all adopted the principles of world class manufacturing, with lean Just-in-Time operations. The companies had very low stocks of inbound supplies and often held even lower stocks of finished goods. Only one of the companies involved in this study reported that its spare production capacity and buffer stock levels had been increased. It had learned the hard way about the inherent risk to service from going too lean. Having increased holding of essential materials, the limiting factor for that business then became storage space for finished goods, or more specifically the availability of transport. In reducing on-site stock and storage capacity, the food and drinks companies had all created an increased dependence on almost immediately available out-bound transport.

"Increased efficiency means sailing closer to the wind, less margin for error. Seeing businesses get into difficulty, you learn from experience… Every category is different, but all are under pressure for efficiencies. We would not put stock in for the unexpected, but would put it in for internally generated events e.g. facility relocation".

"We would run out of space at the factory within 2 days…but we doubled the size of the fuel tanks at the 3PL after the 2000 fuel protest".

"The millers will have up to 5-6 days stock cover at all sites. Depends on the mix, it could be 7-14 days. They used to mill ahead, but don't now. Now milling to order and using blended flours. Most are holding inventory in generic form, but couldn't increase stockholding capacity because we are space constrained".

"Storage of finished product would be the issue. Most packaged product goes down the road to a depot. All bulk goes to silos here and we have storage at a site in the North of England for bulk. Some spare space we could utilise for packed product storage…All product has to be moved one way or another within a week. If transport stopped on Monday when stocks in the silos are highest, it would halt operations almost immediately because of storage. If it stopped on a Friday we would have some bulk storage space."

"We do not hold large amounts of packaging or raw ingredients at our factories. This would vary from site to site but certainly after 2 or three days, many sites would not be able to produce. Many sites would come to a stand still far sooner because of the lack of storage space for finished pallets of goods. We have some sites that have no storage at all. The vehicle is the temporary storage. We have moved away from storing finished goods at our factories. We run them straight into the vehicles that are waiting at the loading docks. These then drive to our Central Distribution Centres (CDCs) for storage and subsequent delivery to customers. We have three CDCs, one is used to build stock for seasonal events in preparation for annual surges. Some products are level demand, but much is affected by seasonal events and weather. If the CDCs do not get vehicles taking away the stock to customers we would soon begin to fill up".

"The RDC has about 3 and a half weeks stock cover (mean average). Our warehouses are 5-10 miles from the site and there is no storage on-site. Packaging on the factory sites is around 24 hours. There are days or weeks available for some at suppliers. We have less than 24 hours of corrugated boxes and no stock at the suppliers. As for waste disposal, the skip would last around 24 hours, but we could manage for around 2 days. The ability to drain away wastage would stop at once, but we could get a licence to release into the sewer".

"If the movement of goods between sites was stopped we could continue production for 6-8hrs, if trailers were there and empty, but product goes

straight from the line to the trailer. After a maximum 12 hours we would stop delivering to customers. We have contingencies e.g. stocks of packaging etc. but it all depends on trailers to take the product out. There are no problems with waste disposal, this would not be affected... Petrol/oil is needed to make bottles but that would take months to effect. We are putting buffer stock back in because of poor supply issues. Stock holdings are 5-6 weeks now (higher than usual because of the new factory)".

"We don't sit on a huge amount of stock. Only have about 2 days of polymer at any time. We could double raw material stock holding to give another 2 days cover, but that would not help a great deal. We've no plans to reduce inventory holdings. We only have a few days transport fuel on site. More or less anything else and we could continue to supply".

Packaging was certainly an important consideration for the fresh and chilled categories e.g. milk, bread, chilled and fresh produce. Companies held some packaging stock on site, but confirmed that their supply chains were otherwise almost stockless.

"Milk is a JIT supply chain. We hold up to 1 and a half days' stock at the depot, but it depends on the day of the week. It can be only half a day. We pack and produce today for tomorrow or at most 2 days time. We can't sit with high stock levels because of short product life and quality. We deliver once or twice daily to the big retailers, 3 times for Christmas. If there was a disruption to transport affecting more than one site we would be severely challenged. Raw milk would run out first, or it might be packaging. It depends on what the problem was. There is not more than 2 days storage of stock at sites. We always have OEM critical spares in stock (in theory). Only a double whammy would take out a line. We have highly automated production planning with packaging 'in-plants' automatically feeding in. Have packaging in-plants for 90% of sites".

"Bakeries carry only 2-3 days stock of flour on site and take approximately 3 deliveries per week. The company holds 11 days of fuel supplies. If it goes beyond that the UK economy stops. The government gives the company and others special consideration [priority user]. Packaging holdings are 18-20 days supply of oil-based polyethylene. One of the big suppliers went bust recently. Switching was a big problem. Packaging is much more integral to the production process than it used to be. It limits flexibility very much".

"A lot of produce is 'stockless' and goes straight through…Packaging varies, on a case by case basis. The product has a finite life…We don't have an enormous amount of waste. Only genuinely bad produce is wasted. Around 2-3% goes to wholesale. Skips are collected regularly and we have storage space in the car parks. Fruit is not a health hazard. We pack at two sites, one in the North and one further South,

volume is roughly 50/50. Packing is bought and delivered in bulk to get best price. We have quite generous stock provision on packaging. We would like to think we are going to reduce stock for cost, efficiency and quality reasons".

5.4 More fresh food with ingredients from further away

If transport between sites (or countries) was impaired, the growth in consumption of chilled ready meal means that a higher proportion of all food lines are impacted more quickly than might have been the case only a few years ago. The retailers had all highlighted the growth of chilled at the expense of other categories (ambient and frozen). The trend was also reflected by branded producers of ready meals who have gradually changed their own product portfolios and business profiles to accommodate changes in consumer demand.

"Ourselves and companies like Birds Eye were the major frozen brands, now we are more chilled, reflecting the move from frozen to fresh. All our company's growth is in fresh. If you close the borders we would have to extend shelf life. There is not enough life in supply. We are working more and more with product with shorter life span, partly due to the drive to reduce additives".

"For meat availability, we would hold additional frozen stocks of meat. We are gradually importing more [frozen] meat rather than producing and have closed some farms because of that. We are rowing back from UK meat rearing in the last year or so".

"Stock holdings for shipping are only up to 48 hours. We can't change it. It comes back to shelf life. We are holding more frozen at the moment, but can't hold stock of chilled unless the retailers relax the requirement. We have taken some decisions on inventory for Avian Influenza (AI) planning. Have taken the decision not to hold stockholdings for some products or finished goods in Eastern Europe, but hold higher UK finished stocks. If the company lost its Eastern European lines because of AI it would bring production back to the UK and vice versa. Closure of borders would cause problems with finished product. EU expansion means the authorities are less likely to close borders from other EU countries. Disease outbreak exclusion zones could affect borders (it has happened). We might take the decision to suspend imports to UK for brand protection issues and have planned for this. We have retained contingent production capacity. Storage capacity is a limiting factor, we must liberate storage to enable new product to come through".

Companies that import large amounts of produce or that had moved all production overseas tend to hold limited amounts of stock in-country. For ambient products, the trend is for central (i.e. European) 'strategic' stockholdings to be held off-shore,

though the feasibility of direct to store deliveries in an emergency was also receiving consideration.

> *"We carry around a week's stock, depending on the season. For produce from the Northern hemisphere it is 1 week's stock, for Southern hemisphere it is 2 weeks. Apples and pears last longer, but are too old at 14-21 days, so stock cover is around 7 days. We also have ships off shore and could divert some".*

> *"We hold 2 months stock in winter and 1 month in summer. We build to stock out of season. Half of stock stored in UK, half in France".*

> *"Infant formula is manufactured in Ireland, then transferred to a warehouse a few miles away. In the UK there are around 3 weeks stock at a location in the South of England, 6 weeks in Ireland, and some stock in Continental Europe. As well as powder that needs reconstituting, we have Tetra paks of product that is ready to use. I don't know about work-in-progress levels overseas, but expect no more than 6 weeks. There is no problem with product shelf-life, nothing has a shelf life of less than a year. There has been pressure to reduce inventory for the last 20 years, but this has not been pushed too far. The pressure from higher up has eased. The UK company determines its own inventory levels, though we are trying to be more selective about which lines and where stock holdings are held. The company is reviewing this internally. We are currently looking to see if company could do direct to store or customer DC in an emergency".*

5.5 Panic buying

The retail and wholesale companies all had experience of panic buying. Fuel was mentioned by everyone, whilst bottled water, bread, milk and infant formula were the most frequently cited food categories in this context. Seasonal or weather-related spikes in demand were common in all these categories though suppliers and retailers were keen to point out that demand surge from 'abnormal events' rarely met or exceeded seasonal maximums.

> *"You can try to go out and panic buy bread, but there's probably not much there to panic buy. You'll get a rush on ambient part baked, because you get a rush on that at Christmas. It's what people buy in at Christmas when they need to buy 3 weeks stuff to last the 2 days while the shops are shut. Panic buying rushes are generally smaller than Christmas, because you only really have localised ones, where there is just a suggestion or a rumour that there is going to be a shortage".*

> *"Yes. In a crisis it is an inherited response that people go out and buy bread to freeze. They do it in any crisis. It shows a 20% uplift on a day's sale if it's forecast to snow. It can go up 40% for BBQs in summer. The policy is 'when it's gone it's gone'. We can buy from 3rd parties and plan for summer uplift. We can roll 24-36 hours stock if necessary. Highest demand is Thursday, Friday and Saturday. We*

carry stock for the beginning of the week. The company tracks demand daily to improve reactivity then cuts out non-essential (low value) products to meet the surge".

"In the event of panic buying we manage from buffer stock. Would expect panic buying of formula in the event of a pandemic… We do get panic buying (peaks) at Christmas, Easter and bank holidays. Any TV programme on soya formula or something similar, any health scare in the industry, will have an impact".

"Milk is affected by panic buying. e.g. strike by farmers in November 05, they decided to prevent milk tankers from getting out. That resulted in panic buying by consumers. The stores asked for more milk which the company diverted from other sectors".

"With milk we do get incredible spikes with the weather. People then tip the excess. In March there was a 3% uplift with a severe weather warning and a change in pack size. Panic buying customers go for bigger volume packs".

"The company does have the capacity and capability to respond to actual or perceived national or international emergencies. The systems in place are sophisticated enough to support any necessary changes and that normal sales-based ordering and replenishment (real-time) is enough to deal with this. The company has teams monitoring demand and external environmental factors. Weather is the prime driver here, but also other external factors e.g. a domestic emergency situation. The 'tools' that enable this are the company's ability to apply additional 'push' to the supply chain if e.g. the weather forecast is warm, back up to the suppliers. Supply chain event management systems are in use. There is no long-term analysis of demand trends in the company (e.g. long term or extreme weather patterns). Stock cover calculations are based roughly on sales (and lost sales) for the last three years, with some exceptions going back further. The post 9/11 surge was still lower than normal seasonal (summer or Christmas) surge patterns. The company had no experience/record of an exceptional external event that required long term stockholding over and above maximum seasonal demand levels".

Other non-food items like batteries, candles and pet care were also mentioned by wholesalers, smaller retailers and some manufacturers as items that were prone to demand surges in times of uncertainty.

However, bottled water was by far the most widely cited food or drink category when it came to panic buying. Fuel aside, it was the category received most attention from the retailers. It is a key retail category for 'Health' as well as 'Seasonal' ranges, and it is important to high spending customers.

ESSENTIAL NON-ESSENTIALS

"Pet care has a high panic buying profile, along with baby food, toilet rolls and nappies. All are subject to siege mentality. During the fuel protest the pet care business secured diesel storage but on the last day got it desperate. We did keep the factories running. We prioritised inbound and relied on retailer stocks.

Pet food providers are classed as key workers/priority fuel user, because pet food uses animal by-products. It would cause waste disposal problems for the meat industry if pet care stops".

Tinned food also surged with the slightest hint of an emergency. Interestingly, retailers and their food and drink suppliers agreed that the Government's leaflet on what to do in an emergency had little impact on demand patterns, even for bottled water.

> *"The company can respond tactically to some situations e.g. the government leaflet advising citizens about what to do in an emergency. For similar campaigns, advance notice would enable an earlier response. In practice the leaflet caused barely a blip in demand, though the company did increase holdings to support any run on stock. There are clearer examples of uplift exist, e.g. 9/11-induced paranoia. That caused a dramatic uplift in some stocks, a 200-300% increase on a normal week's sales. Bottled water and some tinned products and long-life staples were most obviously affected…"*

> *"I have earlier experience from when I worked for a branded soup company during the fuel crisis everyone stocked up on tinned soup and other tinned foods. There was a massive surge in demand. The scare more recently saw another big spike in demand. At millennium there were rumours of huge stocks of tinned goods put down 'just-in-case".*

> *"We had a surge, caused by the TV and government recommending people stock up with water just in case. Stocks only lasted around a week, but it was not above a hot weather surge".*

> *"Water always goes first and candles can go quickly. In sustained periods of high demand the company has capability to supply, but do get let down by the supply base, e.g. drinks suppliers. For them a bottling plant is a big investment. They keep their resources fully loaded and therefore don't have the capacity for sustained peaks. In 2 weeks of very hot weather the company would expect to run out of some SKUs due to limitations on bottling capacity at suppliers. In these instances consumers usually switch first between brands. No one holds capacity for extreme events e.g. an extra 1000 pallets – the cost is prohibitive…".*

Figure 3 provides an indication of demand volatility for bottled water. The graphic, supplied by one of the bottled water companies, shows demand patterns for its products at one major retailer. Note the uplift in demand in March 2003 at the commencement of hostilities in Iraq. The supplier was keen to point out that the spikes would have been even more pronounced if more product had been available, but it was unable to supply more because of capacity constraints. Both of the water companies involved in this study mentioned this particular surge, even though they appeared to have experienced it at slightly different times.

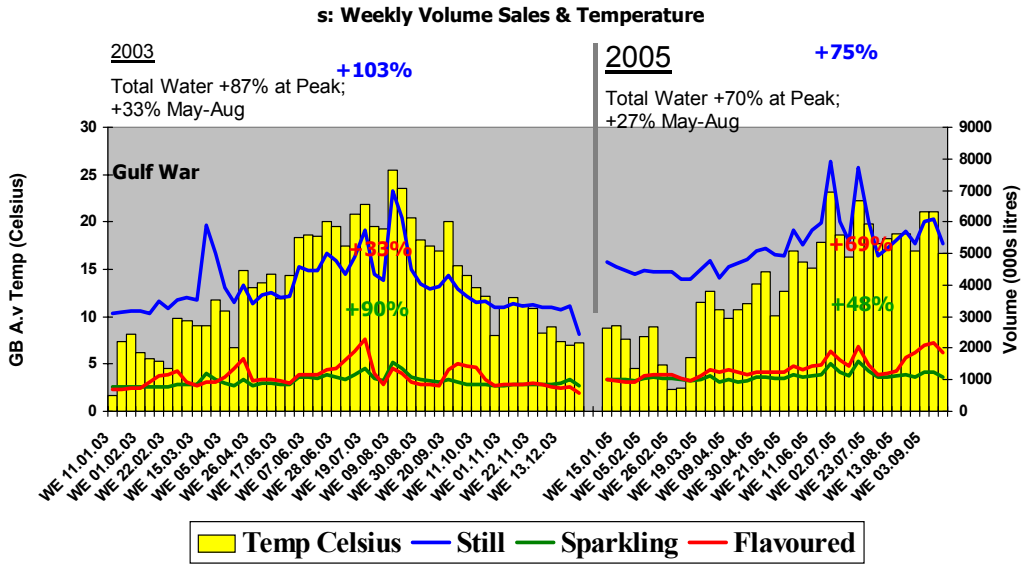

Figure 3. Still Water purchased during the 2003 & 2005 peaks.

> *"We have a good example of panic buying around May 2003 had a huge surge in the post-Iraq invasion period. It disrupted the supply chain enormously. We couldn't get enough product in from Europe. We thought it would be slack the following month, but a heat wave occurred".*

The heat wave in France in 2005 prompted the French government to approach bottled water producers for information on stock levels and details of how much could be supplied. Whilst the companies had been happy to cooperate with the request, one of the bottled water producers was concerned that there was insufficient understanding of the volume required and the logistical challenge involved in moving water. The company made it clear that it would be willing to assist UK planners with planning supplies/distribution if required, and even volunteered to provide people to assist government prepare its plans.

"Bottled water could be a short term or localised solution only, the mains water supply would have to be brought back up quickly. The company has 25% of the UK bottled water market. It sells 500 million litres of water per year in the UK. One person uses 2 litres for a day…stock levels vary throughout the year, but are high enough to deal with a short term doubling of demand. The company can easily manage short surges but not long ones. With political agreement, it could deliver more stock from Europe to the UK, but the key point is to build scenarios and put some quantitative elements in. Water is high volume and high weight. The company has 2000 vehicles dedicated to the business, and has done some international traffic coordination scenarios. The scale of the logistical requirement would be similar to a major military deployment".

Another bottled water producer was keen to point out that whilst there were few eventualities would halt production, there were regulatory as well as logistical constraints which might limit its ability to overcome a disruption to its operations.

"*Only contamination, a factory fire or damage to the physical infrastructure would stop us. Spring water can only be piped up to 5 miles from its source. UK production is constrained by official extraction limits and a 5 mile limitation on piping distance from source. The costs for the business are mostly transport. Water is low margin because of the high distribution costs and low value. We could tank the water and maintain supply, it would be legal but difficult. New sources couldn't tank at all. Old ones could, but it would be impractical. We could keep supply to key customers".*

However, several managers were keen to point out that panic buying was not a purely consumer phenomenon. The retailers readily admitted that they were just as guilty, something confirmed by suppliers of two panic-prone staples: bread and milk.

"It is not just consumers that panic buy – e.g. if a branch manager in South Wales places an order for an extra two lorry loads of bottled water, but that would rob other branches, it doesn't happen in this company. Bottled water is the number one for panic buying. Central allocation works on a 'fair share' basis. Most retailers have systems where local general managers can override the system and put big orders in. This company has an override option, which means that the centre would not allow override unless continuity of supply is guaranteed to the rest of the estate".

"We do the same thing with our supply chain colleagues, they panic buy as well. They try and get as much as they can into their warehouses because that's driven by demand and what's happening down in stores, so there's a ripple, it's not joined up thinking. It's the same if the business thinks that we are going to have a run on water, it will start. If there a shortage we're probably the ones that started it! It won't necessarily start with the consumer, it will start here as we try and get

hold of a bit more of it…If a bottled water supplier or someone like that has a problem. We'd order some more".

"Panic buying can be retailer driven, resulting in 20-50% uplifts. We track sales very closely and normal fluctuations. Sometimes we ask the retailers to do VMI [vendor managed inventory], but the retailers like to manipulate it. Christmas is an annual challenge because it falls on a different day of the week each year".

"The bread retailer can put in extra orders, if one puts in a big order several do so creating up to 15x surge. They create a lot of noise over who gets the bigger share of supply".

5.6 Recovery times

Most retailers, wholesalers and suppliers agreed that their stocks would likely sustain a short 'one off' surge, but that prolonged or successive waves would drain the supply chains. Once buffer stocks were drained, capacity constraints within the industry would extend the recovery period, effectively prolonging the crisis.

"Replenishment stock at DC is greater than lead time, so we could cope with 1 week of extraordinary demand. A crisis of more than 2 weeks would stretch the system beyond normal peak demand. Recovery time is usually 4 days from supplier and 1 day to branch, assuming the supplier is not disrupted".

"A surge in buying creates empty shelves which feeds the panic. In general terms for a 'single day panic' or one comment that creates the panic, the lead-time is between four weeks and sixteen weeks to normalise sales and availability. The replenishment will be continuous, and as fast as the products are produced but consumers will want more".

"After panic buying the recovery took a long time because of capacity constraints. Around 50% of lines would be OK, and be supplied from reserves, around 25% would manage replenishment recovery in 2 weeks. 25% in 4 weeks, but it depends on how long the panic lasted. Big multi-packs/big bottles go in a panic".

"Bread would recover next day. Bread is a category that 'when it's gone it's gone'. Bread goes in the day and tomorrow is another day. Salt is more usual, in that when it get surges it experiences longer disruptions"

"Sugar is not affected by panic buying. It used to be a staple, but it is not seen as so nowadays. Yes, it has been in the past - 1970s sugar shortages with the lorry drivers strike. There was no shortage of supply, just panic. Nowadays we get blips occasionally with industrial customers. Some soft drink manufacturers can get a run in the hot weather which feeds through, but that is an uplift in demand, not panic".

There were some staple foods that were never affected by panic buying, including breakfast cereals and other everyday processed foods, though some of these were prone to fluctuating seasonal demand. In an emergency, producers of non-surge items believed that where possible they would apply 'Christmas' measures to optimise availability.

> *"We do a vast amount of planning for Christmas seasonal peak, looking at every aspect of supply. Activity is more than double at Christmas, everything stretched to the limit. We have to find creative ways round it e.g. much more effort into sequencing and scheduling and direct store delivery to by-pass facilities. In an emergency we would probably just do what we do at Christmas.*

> *"We don't have panic buying, we do have problems with pump-priming the supply chain for changing recipes on short season lines. If we get a disruption in the supply chain it can take up 12-16 weeks to recover".*

There were also categories – notably meat – that are expecting what may be a huge drop in demand if Avian Flu or another livestock disease comes to the fore. Consumers' reactions to events of this kind are often irrational, whilst the damage to the industry can be very long-term.

> *"We recently saw an uplift in demand for turkey because people didn't want to eat chicken because of Avian flu!".*

> *"How long is the disruption? I plan for this for a living. For a catastrophic loss e.g. loss of a farm would lose 2 weeks supply. Occasionally we lose sheds full of birds, it takes 21 weeks to grow a turkey! For a wider problem you'd lose yield if you lost the gene pool, so would have to import meat to cover the shortfall. If you lost the frozen stock in frozen warehouse recovery would depend on the time of year. If it was in August we would not recover for Christmas because of the volume. Production capacity would need 3-4 months to recover. There is not enough capacity in the UK industry to fill the gap. You would have to go to the international market to supply and accept a change of specification e.g. Brazilian turkeys are not all butchered to requirement, as well as rearing issues e.g. GM feed and electric vs gas killing. Gas killing gives a better quality meat than electric".*

5.7 The constraints of specification

Relaxing product specification was a reoccurring theme when it came to maintaining supply in a crisis. In addition to the restrictions on extraction and tanking/piping applied to bottled water companies, many other suppliers of key foodstuffs spoke of 'dual constraints' which would restrict their ability to maintain supply. The first was retailer specifications, including the number of day's shelf-life remaining on receipt by the retailer (not sell-by date), changes in pack size, the use of generic packaging and agreed range reductions. The second constraint was specifically about labelling. Several companies pointed out that they could likely maintain supply of high quality, nutritionally sound product, provided they were allowed to make minor changes to the

product specification, but to do this a waiver had to be secured from Trading Standards and the FSA.

> *"The company has 1200 SKU and 650 products, including 25 core breadlines and 25 morning lines. The sector has experienced considerable product proliferation. Orders to stores are very varied and picked to order in small quantities. Experience from strikes would make them go down to very few SKUs and basket bulk orders which equal 60-70% of output. This would be regarded as Force Majeure…Priority would be sliced white in whatever packaging was available".*

> *"Doubt that generic packaging stock would be available i.e. not Tesco or Asda etc. There are no agreements with customers to switch to generic product/packaging. We would negotiate that but it is not yet agreed".*

> *"If there was a meat shortage e.g. breast fillets or stir fry strips could use thighs or wing meat if the retailers would relax the specifications or permit a recipe change for the shortage ingredients. The most unwieldy part of the industry is change in product specifications".*

> *"In a national crisis could you get dispensation to vary product/ingredient mix content? You can't do this under EU law e.g. sweeteners and colours, also labelling to reflect the use of GM and not non-GM ingredients. How quickly could you get a 'yes or no' on changes? Someone needs to think about this. We meet regularly with trading standards on labelling, but local officials couldn't do that, they would have to get Head Office authority to approve variations".*

> *"If a failure at a single source approved supplier occurred, the company could make a safe, nutritionally correct product, but one that might not meet labelling requirements. Normally any variation would go through a Trading Standards Officer, but in the event of an emergency the company would have to make a 'best effort', but labelling requirements would have to be suspended. It would need to be cleared with the FSA. Labelling would be a big problem. It would be too difficult to source alternative, but correct packaging quickly".*

> *"It used to be easy to bottle and distribute milk anywhere in the UK. Now product tends to be locally labelled e.g. Scottish Welsh, West Country. We could have labelling problems, it has to be accurate. FSA very keen to enforce this, it is a legacy of Dutch and Thai Chicken being reprocessed and called British".*

5.8 Market forces and profiteers

Retailers and wholesalers reported that, from time to time, they had to impose bulk buying policies in stores and forecourts to limit the volume/quantity any shopper could take. There was also a consensus that consumers panicked in the direction of the large retailers first.

> *"If the public panic buys, independent retailers would follow soon afterwards. Corner shops would run out very quickly... I would go to Tesco first rather than a corner shop because I could buy more!".*

> *"People will go first to where they think they will get the items, to Tesco, then demand will drip down to local convenience stores like us. Consumers empty the big stores first, because they always assume better availability there. Tesco has bigger volumes, but also bigger demand volatility".*

At the interface between retailers and consumers retailers certainly did not assume that pure market forces would be allowed to prevail with the price mechanism becoming the determinant of supply and demand. In an extreme event several retailers indicated that they would expect Government to come forward and publicly issue guidelines over maximum purchases, to reduce hostility to staff at the point of sale. One of the large transport service providers also looked to government for some indication on prioritisation for food and fuel.

> *"The threat of a shortage or an event (e.g. an attack) is as significant in its impact as an actual shortage or event. Governments should seek to minimise the potential for causing panic e.g. proactive advice. We would be keen to understand what, if any, intervention in the food supply and distribution network there might be from Local or National Government in the event of a flu pandemic i.e. would they introduce rationing of certain products?"*

> *"We would expect the Government to issue some guidelines for bulk purchases and instruct retailers on where supplies are to be directed".*

> *"For a national [fuel] crisis the company would have to prioritise for who needs it the most, with some reference to Local Authorities or Government to provide guidelines. It would likely prioritise health, food etc. – children's toys etc. would be at the end of the list – and ensure supplies".*

The retailers were mindful that consumers have long memories and though keen to ensure in-store availability, were reluctant to place themselves in a position where they could be perceived to be 'profiteering' from a crisis. They indicated that they would resist passing on price increases to the consumer until it became economically disadvantageous for them to do otherwise. However, the findings of this study suggest that prices would rise slightly at the checkouts because retailers and suppliers would quickly abandon promotional price reductions. Thereafter most would look to their supply base to absorb at least some of any actual cost increases. All the

companies would look to see whether competitive advantage could be leveraged from the situation.

> *"There would be a black market in products, but the company would likely try to continue to sell at the standard price, but would introduce some bulk-buying policy (restrictions) to ensure wider availability".*

> *"In an emergency the company would revert to non-promotional pricing (i.e. ordinary prices)".*

> *"The company would do what it could to avoid increasing prices to the customers, but may look to vary the usual product range based on customer demands i.e.[in the event of a pandemic] the company would also recognise the potential for hygiene factors and sell products that it may not usually sell e.g. masks".*

> *"There may also be business opportunities in abnormal circumstances …are there opportunities in Bird Flu?".*

Suppliers of foodstuffs and transport services recognised that whether it was a company-specific event or a national emergency, some prioritisation of supply would be necessary. A moral obligation to prioritise according to social need was stressed by a minority of the companies (one transport service providers, an operator of smaller supermarkets, and one of the key category food suppliers). More said they would endeavour to distribute on a proportionate 'fair share basis', but most of the managers thought their companies would prioritise by simply serving their biggest customers first. They felt that the real competition would be between the large supermarkets with each trying to use its muscle in the marketplace to secure the largest allocation.

> *"We don't do anything which is anti-competitive. We have standard allocation rules for customers, based on an appropriate share. We would look at standard order patterns, though there may be problems with minimum order quantities. Can't be specific, but would lean towards 'fair share basis' and it depends on our commitments, we have to honour them".*

> *"If the company lost its biggest processing site it would have service issues, we'd need a plan for which customers we cut first. We will serve the biggest customers, the big supermarkets, first. We will cut our own label first, the biggest supermarkets require that".*

> *"We would prioritise key UK retail and manufacturing over overseas. UK industry is top priority because it would stop production of food suppliers' plants (big bills!), then big retailers".*

> *"Our glass supplier works very closely with the company and would regard us as a priority customer. The relationship is very important and delivers value on both sides. In terms of priority customers e.g. if there was a problem with one of the best selling lines, remaining stocks would*

be distributed on allocation between the largest customers. In case of major disruption e.g. a Flu epidemic, the strategy would be to focus reduced resources on key product lines and customers. This would be production of biggest lines (by value) only and supply to the Big 4 supermarkets and possibly one of the largest cash and carries. That would minimise impact on profits whilst maintaining supply to the maximum number of consumers".

The food suppliers' attitude towards prioritisation confirmed the fears of some of the smaller supermarkets and wholesalers, (voiced earlier in this Section and in Section 3) that retailer size, the 'fair share' principal, or even short term ability to pay, determined retail customer allocations.

"We get deliveries every day, but I think the big concern would be that the bigger people would get preferential treatment".

5.9 National distribution and emergency cooperation

This study was commissioned to look into business continuity and disruptions to the supply of food and drink for England but, as this report has already shown, the days of 'local for local' food supply has long since gone. The issue of UK-wide rather than simply national distribution was therefore highlighted up by several suppliers. Some were pragmatic and indicated that in an emergency (e.g. severe fuel shortage) they would opt for the most resource efficient way to reach the highest number of consumers. As we have seen some would opt to achieve this by supplying a limited number of customers (big retailers), others pointed out that geography would also come into play.

"Realistically 80-90% of consumption is in the densely populated areas, and there are very few of them once you get North of Leeds. After that it is mostly rural. You could stop delivering to Scotland, not good for Scotland, but it would cut down on the mileage a lot. The population of the UK is moving towards the Channel and away from Scotland".

Some suppliers suggested that if necessary they might be able to cooperate with their main competitors to provide national or UK-wide coverage for basic product distribution. In some industries where there was a history of collaboration e.g. milk, this would be easy to achieve, in others bitter rivalries would have to be put aside. Managers from several sectors pointed out that the industry associations would have a role to play in such a scenario.

"Potentially we could coordinate the big three bread suppliers, with each going to one region, but there is no history or evidence of such planning cooperation. One large supplier is in the North, heading South. Two have national distribution. There are smaller bakers that are regionals. It would be theoretically possible via the Federation of Bakers".

"Core product consumption is historically regionally biased within the UK. In an emergency product could be supplied on a regional basis

reflecting the historical territories. It could work if we supplied direct to store, but we are not geared up for that now. Could only do it on a selective basis and to a limited number of stores and there would be problems of congestion at stores".

"In the event of restrictions on transport between sites we could run into our competitor's facilities and supply customers from them. Have not done this for around 5 years, because of antitrust, but with government approval we could do this. Do have channels to talk to the competition and continental manufacturers".

"There is history of cooperation in this industry. A local chicken producer had a fire, we offered help e.g. employees. The British poultry industry is quite good at helping each other out with reciprocal arrangements for crisis management e.g. poultry killing. It is still a largely patriarchal industry, with family businesses that know each other".

FEEDING ENGLAND OR THE UK?

"We are not the largest retailer, but we are the ones with the widest national coverage. In effect our National Distribution Centre in central England is supplying every store in our network. In terms of case movement, you've got stuff from there going to everywhere from Lerwick to Northern Ireland, to the Scilly Isles, to Dover and the Channel Isles. We are still more national than anybody else. Tesco is probably getting there now. There are some 'deserts' where we have no stores, but they're not huge now. I guess we are operating in effect one network, covering the whole country, and we are the only ones that are in some of the Scottish Islands. But that's because that is the nature of our business, there is a social responsibility as well. We are there where other people aren't.

In England and Wales, the longest distance served from a depot is probably about 150 miles. Our ambient sites stretch as far South West as Somerset, the Scilly Isles and to the end of Cornwall, but also into South Wales. You have to come back 50 miles to Bristol and then across to Port Talbot, that must be 150 miles. We have the odd outposts like the Channel Islands, so you've got a nice sea crossing there as well".

5.9.1 Liaising with emergency planners/services

The last point on the interview schedule for this study was about links between the participating organisations and emergency planning authorities. The responses to this question were very varied.

The largest transport companies, very big retailers, plus representatives of politically sensitive categories e.g. bread and milk were the most likely to declare direct links or

dealings with national government on civil emergencies. They were also likely to be actively engaged in discussions via their industry associations. Who was talking to who tended to reflect operational vs strategic roles within their organisations.

The retailers and wholesalers declared the following points of contact.

> *"We have links via the Institute of Grocery Distribution and the Food Emergency Liaison Group. A regular topic is emergency planning in supply chain. It has to be board-level representation because of commercial sensitivities".*

> *"We have a government affairs team which is our first point of contact. The British Retail Consortium updates us on contingency planning…There are formal links and informal links with the local fire and other emergency services and with the local County Council emergency planners. The stores provide power for the emergency services and make short-life food and water available for emergency services and walking wounded. This is part of Corporate Social Responsibility and is very important…We have a home authority relationship with local county and district environmental health teams. During foot and mouth we worked very closely with environmental health who signed product off at our depots".*

> *"Links with emergency planners? Not in any formal manner, but do have someone here with contacts in the Met".*

> *"We work with the local emergency services e.g. the fire brigade. If there was a fire all the guys on site would work with the fire brigade to sort the problem out".*

The politically sensitive 'key category suppliers' declared the following, though it should be noted that the majority of these were not English companies, they were importers rather than domestic producers, UK arms of multinationals, or businesses based elsewhere in the UK. They relied heavily on their industry associations.

> *"We do liaise with Scottish Parliament and our industry trade body. It depends on the incident, but have links with local authority for food safety and established escalation links".*

> *"None known, only through the Food and Drink Federation. For BSE and Foot & Mouth, the industry association was very good at keeping everyone up-to-date. If formula supplies were disrupted there would be problems feeding infants under 5-months and some problems with infants under 1-year. For Y2K we did produce information for parents to advise on safe alternative feeding. The industry would work together on this through the Infant Dietetic Food Association. There is a committee that meets and calls regularly and long established links within the industry".*

"We do get involved in exercises from time to time e.g. nuclear accident 'Blue light' exercises and table top exercises like how we would organise milk or identify/segregate milk supplies. The structure is in place to go through these exercises if required".

"We have received the Cabinet Office Survey and Dairy UK is doing one. Freight Transport Association is doing one too".

"The Cabinet Office goes to the Plc. Some enquiries go to technical. Specific issues go via industry associations. There are contacts via the Federation of Bakers or National Association of British and Irish Millers or Food and Drink Association. The group has technically wider links with the scientific communities and good links with retailers".

"No formal links with the emergency planners. British Soft Drinks Association is coordinating an undertaking to supply emergency stocks".

"Have a lot of contact with the local council near our water extraction site. Meet with them in a planning and environmental context. Don't know about emergency planning".

The transport companies also used their industry associations as points of reference, but had had dealings with the DTi over fuel and with the security services about the possibility of fuel tankers being used by terrorists as bombs. The feeling was that although the companies cooperated with the authorities, it had been a one-way conversation, with not a lot of information coming back. The packagers also worked through their industry association with representatives notably liaising with the Treasury over fuel costs.

The remaining food and ingredient suppliers were more likely to be involved with local councils and 'Blue Light' emergency services. Some declared no known links what so ever, but others were actively engaged at the local/factory level. They saw support for their local communities as part of their corporate social responsibility activities. At least one had won an award for its work in assisting with the training of local police. They did not declare direct links to the national government or liaise via industry associations to the same extent as the previous groups.

"We are part of the London Resilience group, and are keen to help SMEs [small and medium enterprises]. We work with London Resilience, the local authorities and emergency services. We have taken part in local rehearsals nearby, for the emergency services and to support the local community. At the higher level, we suspect that government links are more likely to be based at London".

"Our main Factory Site and Head Office have links with their respective local emergency planners, but at this stage it is a low level of communication and sharing some information".

"Not at the higher level, but at the site level with local emergency services it is likely".

"The company does work with emergency planners, though contact has not increased during recent years. We take part in resilience conferences and rehearsals at 2 sites with the petrochemical industry nearby. We do full rehearsals with the fire brigade. PR issues surfaced with communications with the fire services about that. 7-8 years ago there was a train crash scenario, local police had an assumption that the shopping centre would be evacuated on to this site. It was all in the emergency plans but no one had told us! The next scenario was a flammable crash, but we couldn't shut down the ovens for 11 minutes. If you close them they would ignite and become a source of ignition. When alarms go off, key staff stay inside to close down the ovens. This was unknown to the emergency planners and professional services. We try to keep the fire services out (microbes and damage to equipment etc). The fire services don't always understand this".

5.9.2 Contingency planning in government: enabling the enablers

Several companies did lament the passing of government stockpiles as a fall back during times of national emergency. There was a wider feeling expressed that government did not recognise the strategic role of the food and drink industry, or the practical problems that might ensue in an emergency.

"During the Cold War government policy was to stockpile, with packaging required to keep food for 12-24 months for emergency rations for nuclear war. Not so now. In the event of an emergency people will panic buy. The US has done lots of post 9/11 planning for food etc (e.g. Homeland Security funded project coordinated by the University of Minnesota)".

"Many years ago the Co-operative movement had a 25% share of food sales in the UK. Its importance to the nation was recognised in WW2 with a seat at the Cabinet Table. The Head of the Co-operative Union was made head of the Admiralty. That's how important government used to think food distribution was".

"Defra are getting their act together, their website is more user friendly and they are working more closely with Europe. Good communications with agencies and internal stakeholders is essential".

"Advance notice of any government public awareness campaign would be useful, so retailers/wholesalers can prepare for a surge or panic buying".

"Emergency planning needs to be rethought and possibly reorganised. The way money, food etc is produced and managed was local in the 1940s, not so now. Individual households were also more resilient in

that they had solid fuel - not electric – heating. They could cook and get light without being dependent on modern complex distribution systems".

"Government relationships would be better if there was consultation, not just a stick. They need to be realistic. For the independent retail sector, if there is a problem with electricity it does come down to baseball bats and DIY solutions, which would contravene Health and Safety regulations for electricity. There are working time directives that might be stretched (e.g. for a pandemic). There are also girls in the shop who don't want to pay a stamp. You can't ask people to work longer hours if they start losing benefits. There may have to be a waiver on that".

The priority user scheme for fuel was a particular source of confusion and frustration.

"We need government to verbalise the policy for priority users very publicly. A four page list of priority customers is a problem for forecourt staff".

"Need a senior minister involved in a round table meeting re bureaucracy".

Section 6. Conclusions and Options for Improvement

6.1 Business continuity management in the food & drink industry

Business Continuity Management in the food and drink industry is driven by enlightened commercial self-interest. The companies involved in this study were among the industry leaders, most are large PLCs or subsidiaries/joint ventures of large corporations. Within them BCM is recognised as a rising discipline and a growing concern which increasingly overlaps with, or is part of, a formal risk management agenda being pursued for reasons of corporate governance. Linked to corporate governance are matters of brand protection, corporate social responsibility (CSR) health and safety concerns and past experience of serious disruptions. In terms of timescales it is evident that the larger organisations have been actively ramping up operational risk management/BCM over the last 5 years.

In one respect the findings show that the underlying positioning of BCM is moving in line with current 'best practice' thinking as presented in the emergent British Standard, PAS 56 (2003). PAS 56 argues the case that BCM is an integral part of corporate governance, and states that BCM should be undertaken because it 'adds value' rather than because of governance or regulatory considerations. The findings of this study show that, whilst the value-added position is a noble ideal, it does not reflect reality in practice. This study revealed instances where risk management efforts were ramped up to meet emerging requirements or for stock market floatation. In instances where ownership structures again changed to the point that a company was de-listed from the stock exchange, risk management measures were prone to lapse. In unquoted companies, customer pressure and insurance related concerns were also sometimes cited as raising BCM's profile.

Food scares, i.e. a disruption caused by product contamination, are what retailers and their suppliers most fear, more because of the damage it could inflict on their brands than a fear of litigation. Food scares are also the events that the industry is best prepared to deal with. Such was the sensitivity about contamination that most managers were only willing to discuss ingredient or fresh produce contamination. They all confirmed that traceability systems were in place and that these had proved their worth during the Sudan 1 scare in 2005. However, some managers also pointed out that whilst their systems had risen to the challenge of product recalls, the Food Standards Agency's own systems had not always managed to do the same.

These findings concur with those of an earlier study in the US (Rice and Caniato 2003) which revealed that companies were primarily focussed on reactive measures to meet regulatory compliance criteria and similar mandates. However, whilst the US study found little evidence of proactive measures to deter terrorism or mitigate its impact on the organisation and its supply chains, terrorism was clearly a concern to some of the organisations who participated in this study. It was just one of a number of high profile 'external threats' that had raised awareness of the need for crisis management. It had helped to legitimise the case for continuity planning in some

organisations, not least those who had previously suffered from terrorist bombings. The fuel shortages, floods and the Buncefield explosion had all encouraged at least some organisations to explore 'what if' scenarios. Nevertheless the findings of this study suggest that it should be recognised by those with civil contingencies responsibilities that the purpose of operational risk management and/or BCM in commercial organisations is to protect the well-being of the business, its customers, employees and shareholders. It is not undertaken for the wider public good.

Moreover BCM is an emerging *management* discipline, as such it concentrates on what can be *managed*, which is itself determined by resources and the limitations of management control. Efforts are therefore focussed, as current 'best practice' (PAS 56) suggests, on maintaining everyday operations under more or less normal external conditions and within the usual constraints of margin-pressured businesses. The under-resourcing of business continuity in retail, food and beverage organisations was a problem flagged up by an earlier study of 1000 risk managers in the food industry (Moore 2005). The findings of this study broadly support this earlier quantitative research in respect to resourcing and progress on implementation. Unfortunately the findings of this research also suggest that the most politically sensitive categories are often the lowest margin lines, and therefore managers find it particularly difficult to justify the cost of 'just-in-case' proactive BCM. However, even if the resources were readily available to implement best practice BCM across the sector, best practice still only encourages organisations to eliminate known weaknesses *within* their own organisations, and to do so in an efficient and cost-effective manner.

On a more positive note it was clear that most of the companies did have some form of on-going BCM programmes mapped out, which tended to follow a similar evolutionary pattern. Programmes would begin with the introduction of risk registers and the establishment of reactive, flexible and responsive crisis management teams. It is likely that the origins of these teams would be rooted in and adapted from Health & Safety and product traceability requirements. Sometimes reactive measures would be combined with forward-looking horizon scanning, but this was certainly not always the case. Only around a third of the companies studied were actively implementing preventative continuity planning using best practice methodologies. This finding again concurs with Rice and Caniato's (2003) earlier US-based study, which concluded that 'advanced' forward-thinking preventative approaches to supply chain resilience are the exception not the norm. Moreover, this study found that those who had sophisticated continuity programmes in place were often companies that had learned from the experience of significant disruptions. In a competitive Just-in-Time, least-cost environment, a bad experience was sometimes the only way to provide BCM managers with the hard evidence needed to support a business case for proactive/preventative 'just-in-case' planning and contingencies. This was particularly so if contingencies involved maintaining redundant capability and capacity within the organisation.

In theory, the scope of best practice BCM has moved on from IT disaster recovery, through the protection of mission critical data, to protection of mission critical assets and, more recently, to maintaining mission critical activities (Barnes 2001). The findings of this work indicate that the principles of protecting the 'nerve centre' of the business and the identification of single points of failure are well-established within the companies studied. However, there were clear differences between the few SME

(small independent retailers) and the other larger businesses. The small retailers were simply focused on the immediate problems of survival. For them BCM did not extend beyond some form of basic IT back-up provision and a switching option in case of wholesaler/supplier failure. In the larger companies IT systems were protected by back-up servers and uninterruptible power supplies, but it was also clear that a comprehensive approach to business continuity planning was still not fully established in the majority of organisations, and that routine testing of plans remain some way off, as do formal displacement planning drills. Progress on implementation of BCM was slow and faltering in most of the organisations. Where progress was being made it often reflected the efforts of individuals, who were pressing forward with the thankless task of attempting to establish a culture of BCM. Very few companies had included continuity planning in managerial performance measures or employed dedicated BCM managers, even though the companies involved in this study were some of the biggest and best resourced in the UK and/or Europe. As a result good intentions often withered when key staff moved on, or a more pressing business imperative took centre stage. Moreover, most of the managers charged with fostering the development of BCM are newcomers to the discipline and most of the managers interviewed for this study were unaware of PAS 56 or that a British Standard was soon to be available. The retailers (i.e. those nearest to the consumer) and the largest of the other multi-nationals were the ones most likely to have formal BCM templates and structures in use within their organisations.

Despite the lack of formal tools and specialist BCM expertise, all the companies were implicitly aware of the need to protect their Mission Critical Assets and Activities (MCAs) because they are the core of their businesses. The downside of this is that maintaining Mission Critical Activities was sometimes equated with 'business as usual'.

In terms of the scope and sophistication of company programmes, the large retailers appeared at first glance to be the most sophisticated - they are more focussed on Mission Critical 'Activities', rather than physical 'Assets'. Their vigilance in policing safety and quality in own-label supply chains is recognition that their principal asset is their brand reputation. However this may simply be because current best practice sits best with retail business models and risk profiles. The retailers are Mission Critical Activity rather than Mission Critical Asset focussed because few of their assets are mission critical. The greater part of their networks can withstand the loss of any store and any product supplier without significant disruption to operations, DCs, Head Offices or service suppliers are more likely to create single points of failure. The retailers, by virtue of their dominance of the industry, are further advantaged by being able to require suppliers to hold redundant capacity/capability for them. This tactic reduces the direct cost of contingency to the retailers and provides some breathing space for them as they struggle to implement BCP within their own organisations. They have not yet turned their attention to driving through its implementation in their supply base. Some are asking suppliers for confirmation that plans exist, but have not pursued the issue further.

Similarly, the logistics service providers have few assets of their own, other than skilled employees. They have engaged in BCM on an ad-hoc basis, depending on whether a client was willing to pay for 'nice-to-have' but 'non-essential' extras. There is a tendency amongst some client companies to regard transport services as a

'commodity'. Nevertheless, at least one of the 3PLs is moving forward with a structured BCM programme to provide a standardised approached across all its operations.

The food processors were found to be in a much more precarious position than any other group. Their efforts do centre around Mission Critical Assets, because their operations are dependent on a few capital intensive facilities. The same was true of packaging suppliers who made no distinction between everyday operations, risk management and BCM. The packagers and the food processors have tended to use the ability to 'flex' production between sites as their main fall-back option. However, most conceded that the redundant capacity that provides the basis of this strategy is being steadily eroded by the pressure to reduce costs and optimise asset utilisation. Sites are being closed, consolidated and moved off-shore, at which point the risk profiles for companies operating in the UK changes; the principle dependencies shift from manufacturing sites to the transport, communications and the supporting infrastructure.

Mission Critical Activity-based approaches to BCM also fit well with the practice of outsourcing and with market-based approaches to global sourcing and supply, seen in categories such as produce and commodity ingredients. Potential problems loom when the same 'market-based' logic is applied to transport and distribution. The notion that skilled logistics workers (including HGV drivers), transport and distribution centre capacity are commodities is still prevalent, though the findings of this study suggest that at least in some parts of the country and at some times of year these may be in short supply.

6.2 Actual disruptions and known weaknesses

Given the food and drinks industry's fear of product contamination and the scale of the recalls associated with Sudan 1, it is not surprising that the incident was widely cited. The Sudan 1 episode illustrated the complexity of contemporary supply chains. Like Foot and Mouth Disease, it also provided an example of how the structures and efficiency of supply chains can be counter-productive. On the positive side, Sudan 1 acted like a diagnostic 'barium meal' in that it highlighted hitherto undetected weaknesses in the wider system and in individual company's quality and product recall procedures, as well as failings in the FDA's own crisis handling capabilities.

In terms of asset and infrastructure dependencies, companies are very aware of their ever increasing dependence on IT and telecommunications for central functions and operations. The findings of this study indicate that measures to protect against localised IT failures are good; insufficient planning for new systems implementation is a more likely source of weakness. Interestingly, mechanical diggers remain the scourge of even the best-protected IT systems.

Disruptions caused by denial of access to key sites were less common than might be expected, given the prominence which 'denial of access' enjoys in BCM. The 2005 BCI survey indicated that large scale 'physical disasters', including terrorism, topped the list of perceived threats to business continuity, although the results of this study show that concerns and actual experiences vary even within the food sector.

Retailers were by far the most likely to have experienced terrorist attacks, by virtue of their city centre locations. They have also been targets for consumer terrorism and protesters over the years. The transport providers, distributors and manufacturers felt that they were more likely to be affected by industrial action than terrorism, but were more concerned with events such as the fuel protests or blockades. Farmers for Action were mentioned most frequently in relation to blockades of distribution sites. Site quarantines from industrial contamination or livestock diseases were also cited by some as actual causes of disruptions.

Retail, factory and distribution sites were regularly lost to fire and, less frequently, damaged by floods. Statistically these events were predictable but, as many managers pointed out, fewer and larger production and distribution sites meant that the impact of events of this kind was increasing. Reduced capacity across the industry means that it is also takes longer to make good the resulting shortfall. Only one company involved in this study was investing in increased redundant capacity 'just-in-case' and that was as a direct result of lost business following a break down at a plant. The problem some manufacturers already face is that their own strategies for asset optimisation run in direct contradiction to the requirement for slack in the system. As one manager interviewed for this study observed *"lean focussed operations and BCM's requirement for redundancy do make uneasy bedfellows"*. These tensions are likely to increase if large and powerful customers begin to apply pressure on suppliers to hold contingent capacity (for the customer's benefit), and demonstrate an ability to switch sites as a BCM requirement. The likely result will be greater dependency on responsive international transport systems and infrastructure, particularly for ambient product cover. Fresh foods and produce still tend to be packaged close to market, though ingredients and packaging materials are also increasingly produced off-shore.

Loss of people was the next theme taken up by this study. It found that despite fears of industrial action, disruptions from it in the UK were rare, though some managers spoke of growing militancy in areas of distribution. The actual or potential shortage of skilled staff was a more pressing concern. Distribution workers were not the only ones mentioned in this context, but they were highlighted by several organisations. In some parts of the country there was a growing dependency on migrant workers for both manufacturing and distribution.

Moving on to the implications of a failure by another party in the supply chain, this was most obvious for the small retailers, who are heavily dependent on their wholesalers. However, larger organisations were all susceptible to disruptions from the failure of a key service supplier e.g. IT support, transport services or waste disposal. For manufacturers the failure of a packaging supplier is the most widely cited known weakness, although sometimes the root cause lay higher up the chain with shortages in the petrochemical industry. Contractual agreements were found to provide little cover in the event of a service failure, wider disruption or general shortage. Dual sourcing did provide some contingency, but several organisations pointed out that consolidation at every stage in the supply chains from retailers backwards meant that viable switching options, particularly in the UK, were decreasing.

A combination of market forces – in the form of competitive pressures from retailers and government policy on energy costs – were cited as the main drivers behind the

flight of agriculture, ambient and frozen food production, and packaging overseas. The UK is already much more dependent on international sourcing and supply for food, drink and packaging than almost any other developed economy.

The country's long history as a trading nation with a sea faring tradition has always been one of its greatest strengths, but often vulnerabilities are exposed when circumstances reverse long-held assumptions and strengths become weaknesses. Internationalisation changes risk profiles and exposes supply chains to a wider range of hazards, as was illustrated by some of the multinationals whose managers readily reported all manner of mishaps across their global operations. It appeared to be one of the reasons why multi-national food processors were more likely to have formal BCM procedures in place than their UK-only counterparts.

6.3 Specific scenarios

This study examined three specific scenarios, loss of fuel, loss of energy and infectious disease (loss of people). These scenarios reflect events that could take out common elements of all supply chains.

6.3.1 Loss of fuel

The fuel protest of 2000 was the crisis most widely referred to in this study. The findings revealed that the retailers had weathered the crisis well. The larger ones had used their own forecourts to maintain supplies to stores, whilst the small independent retailers had continued to be supplied by their wholesalers. The crisis changed demand patterns for the independents in the form of increased local trade, unless the store operated a forecourt, in which case food sales dropped.

Problems with the priority user scheme for fuel were evident, with confusion over its administration within the companies, local government and at point of sale. In fact the scheme was widely regarded within the industry as unworkable. There were real concerns that local authorities do not have the resources or systems in place to reliably and quickly issue priority user certificates as and when they are required – even assuming that the local authority staff themselves have the fuel to get to work to issue the certificates. If industry is to plan and have BCM systems in place for immediate activation, it can be argued that local authorities and central government should do the same.

Linked to this predicament is the issue of civil disorder, with reports that during the last fuel crisis police had been needed to maintain order and assist in the administration of the priority user scheme. It is also worth noting that there was a belief amongst some members of the retail community that a disruption of the severity of the 2000 shortages was unlikely to occur in the future, as it was assumed that the armed forces would be brought in to maintain fuel distribution. The validity of these assumptions and how widely they are held throughout industry as a whole cannot be judged from the evidence presented in this report. Nevertheless, it should be noted that the expectation exists and, if widespread, may discourage organisations from holding buffer stocks of fuel or actively planning to overcome such an event in the future.

In fact a reoccurring theme from the fuel protests experience is concerns amongst sections of the retail community that government may also be making plans (or failing to do so) on the strength of wrong assumptions about diminishing fuel holdings across the retail sector and in industry.

Similarly, there was much evidence to suggest that the large supermarkets implemented their own priority user supply agreements during the fuel crisis, by making fuel available to suppliers of key product lines and service suppliers as well as their own vehicle fleets. It is clear that some food suppliers are now looking to discrete arrangements with the supermarkets as their main contingency in the event of another shortage. Whilst this strategy maintains the supply of key lines to the supermarkets (thereby avoiding shortages of food and the associated panic/civil disorder) it could potentially disadvantage those organisations who supply other customers in the catering and public service sectors. This potential conflict of interests should be recognised by emergency planners.

6.3.2 Loss of power/utilities

The loss of power scenario highlighted the wider implications of the fact that managers and their efforts to ensure continuity focus on the avoidance of 'single points of failure' *within their own businesses*. Related to that is the effect of business decisions made in isolation using the traditional 'likelihood x impact' risk assessments matrix. Head Offices and Distribution Centres were recognised by almost all the companies as 'high impact' single or significant points of failure, unlike retail outlets or wholesale branches. Consequently, Head Offices all had UPS for IT, whilst DCs had diesel-powered emergency generators to support some or all of their activities. In the event of a power outage, the administration of activities - such as purchasing and invoicing - should continue to run (sub-optimally) for some time using back up power and historical order patterns. Provided that DCs had sufficient stocks of diesel for generators, it might be assumed that they too would not be affected. In the retail stores, if back-up power is not available, chilled and frozen stock would quickly deteriorate. There would also be problems with pricing, tills and replenishment, as bar codes, which have replaced price labels and facilitate replenishment systems, become unreadable. Paper-based credit card payment at point of sale is also no longer planned or prepared for. Hence a policy amongst most of the retailers to 'manage for closure' i.e. clear and close affected store as quickly as possible. Security could also be an issue as lighting and burglar alarms would be affected after some time.

However, the absence of generator provision at the retail sites – including some of the largest new superstores - has far reaching implications for the wider distribution system in the event of a prolonged widespread outage, or rolling power cuts. The findings of this study suggest that rolling power cuts could be particularly disruptive to supply chains, as they would take out some nodes in the network but not others, disrupting the overall flow of goods through the system. Without power the electric doors and loading bays at stores would be inoperable and delivery schedules would be severely disrupted by multiple store closures. The DC's would then rapidly run out of storage space for 'undeliverable' loads, which would reduce the throughput at DCs. Meanwhile the transport operators would quickly run out of empty trailers. Normal contingency measures for loss of DC operations (e.g. direct to store delivery) may not

work in this instance. Several days notice of managed power cuts would be required to allow an orderly rescheduling of deliveries to stores.

At the manufacturing sites, some but not all of the companies had the capability to run independently of the National Grid, i.e. in 'Island Mode'. Factories used electricity and/or gas. Some of those without backup power had decided that a business case could not be made to justify maintaining generators, for others the power requirement was simply too great. Some felt that because they were producers of essential food stuffs their factories would be granted immunity from managed power cuts.

The issues surrounding paper-based working for the manufacturers were different from those facing retailers. Some of the manufacturing/importing companies have invested heavily in comprehensive IT back-up, to the point that provision paper-based trading is felt unnecessary. These tend to be multi-nationals with Group HQs overseas. Across the manufacturing sector payment was not a short-term priority, but order processing was. For manufacturer-to-retail transactions the biggest difficulty would be insufficient manpower to manage the volume of paper-based transactions. Business-to-business ordering (between factory and ingredients suppliers) and factory planning was deemed to be more feasible. Some companies had paper-based back up systems in place to manage those aspects of the business. However, food traceability compliance would be compromised. Wholesalers and importers highlighted the same problem.

Loss of water supply was not a scenario specifically pursued by this study. Nevertheless it was identified as a scenario that would halt retail and food processing operations relatively quickly. A few of the companies had their own boreholes, others had investigated the possibility of sinking their own, but had been unable to secure permission for water extraction. The main finding to come from this section is the concern of a bottled water producer that government and emergency planners should not assume that bottled water is a viable option to replace mains water supplies in an emergency situation. Their concern is that the industry's production and transport capacity are insufficient to support anything but a very short term or localised disruption to mains water supplies.

6.3.3 Infectious disease

The purpose of the introduction of a question relating to 'infectious' disease was to ascertain the impact of loss of people, however issues of quarantine were also implied. It was designed to illicit 'effects-based' information on how well-placed, or otherwise, the companies believed themselves to be to handle the implications of a serious epidemic (human or livestock), or the possible effects of bio-terrorism. This 'wild card' represents the area where there has been the most dramatic shift in attitudes over the course of the study. It yielded information on policies and perceptions relating to both a human flu pandemic and to avian influenza and other livestock diseases. Infectious diseases in livestock are effectively product contamination, all be it of a slightly different nature to the contamination of prepared foods by Sudan 1.

6.3.3.1 Avian Influenza: H5N1

The retailers and producers with business interests in the Far East have experience of H5N1 and had been monitoring its progress. Manufacturers were preparing to reformulate products with high poultry content. Some had changed stock holding policies in the light of AI-related uncertainty over international supply and demand. Those with poultry rearing interests had bio-security measures in place. A minority of the ingredients suppliers had staff that might be in proximity to poultry when making deliveries to or collections from farms. They were aware that this might be viewed as a high-risk activity by employees, suppliers and trade unions. A number of companies had investigated the sourcing of face masks and protective clothing and had been surprised to see prices rising sharply over a number of months.

6.3.3.2 Pandemic planning

By the time this study was completed all of the companies involved were conscious that a pandemic could mean labour shortages and high levels of absenteeism. Most felt that their workers should receive vaccinations/Tamiflu and protective masks as a matter of priority. Preparations for a human flu pandemic were well underway in the biggest supermarket chains and to a lesser extent in the wholesale companies and smaller supermarkets. In the event of an outbreak the large store operators were expecting a sharp rise in demand for home delivery services and the possibility of store closures.

In addition, the superstore operators raised the potential role of in-store pharmacies, which could act as treatment centres, although the limited numbers of pharmacists were potential points of failure. This further underlines the multiple roles and potential conflicts of interests faced by large retailers in the event of a national emergency. All the retailers were concerned about staff welfare, duty of care, and staffing levels, especially in the event of school closures. They also expressed fears of public disorder and pointed out that their primary concern had to be for the welfare of staff and customers. Again there was the expectation that the police would be brought in to maintain in-store security. The fear that the Army might commandeer assets or 'take over' transport and distribution at the large supermarkets was also expressed.

The 3PLs and others with high staffing levels in distribution were concerned that absenteeism would soar. Worryingly, some planned to overcome pandemic related labour shortages in the same way as they would deal with industrial action – through the use of agency staff. This line of thinking assumes that (apparently immune) agency staff would be readily available.

Preparation varied amongst manufacturers and importers, some were drawing up detailed succession plans and contemplating reducing product variety to conserve resources. Other companies were simply maintaining a watching brief with crisis management teams ready to swing into action if and when H5N1 jumps the species barrier.

6.4 Stock cover, panic buying, and industry dynamics

The starting point for this section of the report was to take up where the theoretical study *'Life without Lorries'* (McKinnon 2004) left off. It asked the questions on stock holdings and how long could operations be maintained if the movement of goods between sites was stopped or seriously impaired, but where McKinnon's study worked on the assumption that demand levels would remain static, this study aimed to capture some sense of the dynamics of the marketplace.

This study echoed McKinnon's findings, in that the pressure to reduce stocks whilst maintaining product availability to the customer is a constant theme right across the food, drink and packaging industries. It reflects the essence of efficient supply chain management; a goal that industry strives to achieve. In this context the UK grocery sector is a world class operation, the velocity of the supply chains and sales per square metre are amongst the highest in the world. Without exception, all the retailers and wholesalers/distributors were continually striving to reduce stock levels and stock holding locations throughout their systems. It is a pattern that is being repeated across industry, with all the companies being encouraged to adopt broadly the same approaches to network optimisation often by the same external management consultants. The result is a clustering of strategic distribution centres at several locations within the 'Distribution Triangle' of central England. Whilst this strategy improves the chances of survival in a 'business as usual' competitive environment, it means that the network structures may be less able to cope with abnormal events. The dispersed distribution centres of the wholesalers and smaller retailers have in the past made them less commercially competitive than some of the leading supermarket chains, but also less directly vulnerable to large scale supply chain disruptions because their networks still retained some redundant capacity and maintained higher stock levels.

The notion that the very small retailers are sitting on dispersed stocks of ambient products is to a degree still true, if the items in question are slow moving lines like tinned soup or coconut milk. But they no longer hold high stocks of fast moving ambient staples, which are replenished on a Just-In-Time basis alongside a higher proportion of fresh and chilled produce. Consequently fast moving ambient staples make up a smaller proportion of their turnover than has historically been the case, which has triggered a reduction in stock room capacities to make room for more productive retail footage. The change in stock profile and policies is also driven by competitive pressures from the market leaders who have latterly expanded their presence in the convenience sector. In fact the influence of the largest supermarket retailers on every aspect of retailing and food supply in the UK cannot be underestimated. One leading chain has set itself the goal of a 10% stock reduction year-on-year as a proportion of sales. Moreover, the rest of the industry plays catch-up to the market leaders. All of the other organisations in the study underlined the dominance of the big retailers in the marketplace, but also their influence on the other sectors. The biggest retailers are reshaping entire industries with their sourcing strategies; they call the tune for food, service, and packaging suppliers and set the competitive benchmarks for even the smallest retailers.

Within the manufacturing sector the story is more or less the same. Stock holdings have given way to the just-in-time deliveries of ingredients and packaging. More and more manufacturers have dispensed with on-site storage for finished goods, which are loaded onto trailers and dispatched immediately to distribution centres or direct to stores. Thus, any disruption to transport could quickly halt operations because of limited on-site storage. Furthermore, the leanness of operations causes problems during and in the aftermath of panic buying, particularly in ambient products. Once drained of their stocks these supply chains take longer to recover because they do not have significant capacity to increase production and make up shortfalls quickly. This was amply illustrated in this study with bottled water, the most surge-prone staple. Bread and milk are stockless supply chains but their short shelf life and frequency of replenishment automatically places limits on supply and the industry's ability to surge, which in some ways allows a faster return to normal trading conditions.

However, in the event of panic buying this study shows that irrational behaviour by consumers was only part of the problem. Rational competitive rivalries also drive the retailers into panic buying frenzies of their own, whilst ill-judged comments by government can also contribute to demand volatility.

The possibility that suppliers could shift to a reduced number of essential product lines in an emergency has surfaced at various points in this study. The findings indicate that retailers would likely attempt to respond to consumer demand and select lines accordingly, but they emphasised the need for government to give clear public guidelines regarding rationing policies at stores to defuse some of the hostility from the public towards store staff.

Under the same circumstances and given the choice, at least some of the manufacturers would opt to reduce the scope of their operations to focus on maintaining supply of their best selling product lines, to their largest customers, in the most densely populated areas. This would safeguard the financial well being of the manufacturer whilst focusing deliveries to maintain supply to the highest number of consumers in the most efficient and cost effective manner. Not all the companies said that they would follow this line of logic. Some said they would attempt to allocate supplies on a 'fair share' basis. One key category supplier said it would prioritise one of its smaller national customers because of a moral 'duty of care' obligation as a single source supplier, but this was the exception not the rule. Several companies did say that they believed it would be feasible to work with competitors on a historical regional basis to help maintain supply nationwide. This option may currently fall foul of anti-trust regulations, but in an emergency such agreements might be brokered by industry associations.

It is recognised that in a real emergency consumers might simply be happy to take whatever they could get. Nevertheless one suggestion from a wholesaler/distributor was that emergency planners should consult with retailers to prepare lists of essential 'priority' lines (including essential non-food items, such as over-the-counter medicines, bin liners, batteries, pet food etc), to be issued to retail, wholesale and third party logistics providers' distribution centres now and held both on paper-based and electronic systems. This would allow warehouse staff to designate some bays (e.g. marked with a yellow spot) as priority line locations, with the instruction that in a

declared emergency, distribution of these lines took priority over all others unless or until instructed otherwise.

Finally, this study was commissioned to look into business continuity and disruptions to the supply of food and drink for England. The retailers and suppliers are increasingly international, but even 'local' in-country distribution is UK-wide. As one of the smaller supermarket chains pointed out, if the market was left to its own devices in a crisis the large retailers would receive priority over smaller operators. The merit of this strategy is that it would allow the largest number of people to be supplied using the fewest resources. Taking the commercial logic of priority supply to the largest supermarkets, Southern and Central England would be relatively well catered for, as they are where the 'Big 4' retailers are firmly established and are within easy reach of the Distribution Triangle. However there are parts of the country where 'Big 4' penetration is still relatively low. Remote and socially deprived areas of England are not so well covered, nor are some of the Highlands and Islands, or even Northern Ireland. Nevertheless supplies to these regions pass through England so would likely feel the effects of any disruptions to supply.

In conclusion, the systemic supply chain disruptions this country has experienced in recent years can arguably be construed as the dark side of this efficiency, the price we pay for world class performance, low prices and unprecedented choice of high quality foodstuffs. The big supermarkets provide the 'best practice' exemplars in business school text books, demonstrating how integrated global supply chains and market forces can deliver world-beating performance and outstanding value propositions to consumers. They provide 'one-stop' shopping for everything from food to fuel to banking to pharmacies. They are the quartermasters of England. They operate very efficient, non-exclusive, distribution channels which for government and emergency planning purposes, underlines the need for inter-departmental planning. On the ground the multiple roles of the retailers raise conflicts of interest in times of petrol shortages. Is the primary role of the supermarkets to supply of food or fuel? Similarly should key food categories get priority before over-the-counter medicines and pharmaceutical supplies? Or even black plastic bin liners - an essential hygiene item and the stock keeping unit most frequently requested by the British Armed Forces when deployed on operations.

6.5 Suspension of regulations

The problems surrounding the administration of the priority fuel user scheme have already been discussed, but there were several other issues, which also surfaced frequently, regarding regulation and the requirement for a 'joined up government response' in an emergency. In each instance the companies emphasised the need for government to have systems in place which ensure swift implementation of temporary waivers on regulations, thus enabling industry to rise to the challenge of changed circumstances. It is recognised that the regulations are there for a reason and it could be argued that the need to protect the public would be even greater in abnormal circumstances, although the suspension of regulations may well be the lesser of two evils.

- In the event of a widespread and prolonged power shortage, some companies believed that they could continue to operate, but traceability systems would be compromised. Emergency legislation would be needed to short circuit traceability requirements.

- In the event of a life threatening epidemic or contamination threat from Chemical, Biological, Radiological or Nuclear sources, retailers and transport service providers may have to resort to volunteer staffing, but it would require suspension of legal liability and everyday duty of care legislation.

- In the event of Pandemic flu, some companies would request a temporary suspension of the driver working hours directive. This issue was highlighted during the Foot and Mouth Disease outbreak.

- In the event of a flu pandemic retail store owners would seek some waiver of benefit rules, to allow part-time staff to work longer than usual hours without being penalised by loss of benefit entitlement.

- In a crisis companies would seek permission to vary product formulation from that specified on the label, i.e. to produce a nutritionally safe and functional product, but one that might not exactly match the formulation on the packaging.

- Anti-trust regulations that inhibit competitors from collaborating might be waved to allow them to work together to ensure national distribution of key foodstuffs.

6.6 Options for improvement for business

In a perfect world this section would recommend that resources be made available to enable businesses to implement appropriate BCM throughout their organisations, and that redundant capacity and capability should be held by all, just-in-case. In the present business climate however, this may not be a realistic proposition, although circumstances may change over time. In the meantime the following options are more likely to be economically viable.

- Guidelines are available to assist those who are new to BCM through the first stages of implementation although they do not appear to be widely used. Many of the managers interviewed for this study were unaware of the existence of PAS 56. Although it is not a perfect document it, or its successor, the full British Standard, should provide a ‘starter for 10’ for those new to the field.

- BCM is not yet embedded in the culture of most of the organisations involved in this study. The evidence suggests that the old management maxim of ‘what gets measured gets done’ may well be the way forward. The inclusion of proactive BCP/BCM requirements in managers’ performance metrics and bonuses would help to establish the process.

- In lean, mean and margin-pressured industries like food and drink, logistics or packaging, managerial time is already short. The production of basic templates and training to assist managers to put together plans will go some way to help in this area.

- Poor planning for new systems implementation, though not as common as it once was, is still the cause of unnecessary disruptions to supply chains. The business case for better planning for systems implementation should not be difficult to make.

- Care with telecommunications routing. For new sites and upgrades ensure that communications are not dependent on a single cable and, as far as is possible, that multiple-core cables are not fed through the same locations.

- Watch industry dynamics and use horizon scanning to augment crisis management arrangements.

- Adjust distribution strategies and stock holdings/locations in advance of foreseeable disruptions e.g. fuel protests.

- Conduct succession planning, which can only be good for the business. For pandemic planning it may not be fail safe, but some named successors are better than none at all.

- Many companies talked of range reduction for an emergency, though most said nothing had been agreed. Basic agreed protocols could be laid down as a default option between suppliers and customers, for activation as and when required.

- Re-examine any contingency plans that rely on 'market-based' contingencies for assets/supplies that are not true commodities, or could be taken out by one of the scenarios outlined in this report e.g. transport or agency workers.

- Re-examine contractual agreements that 'guarantee' cover for mission critical activities/assets in an emergency. Does the contract assume that only your company is affected?

References

Aichlmayr, M. (2001) The future of JIT – time will tell, *Transportation and Distribution*, December, 18-23.

Aichlmayr, M. (2002) Mission critical: closing security gaps, *Transportation and Distribution*, May, 28-32.

Barnes, B. (1999) in Hiles, A. and Barnes B (eds.) The definitive handbook of business continuity management. Wiley & Sons, Chichester, p.xvii - xviii.

Business Continuity Institute (2005) Business Continuity Research, http://www.thebci.org

Cabinet Office (2001) Comparing the 1967-8 and the 2001 Foot and Mouth Epidemics.

Cabinet Office (2003) Dealing with disasters, revised 3rd ed. London.

Cabinet Office (2004) The Lead Government Department and its role – Guidance and Best Practice, London.

Cabinet Office (2006) Capabilities Programme. http://www.ukresilience.info/preparedness/ukgovernment/capabilities.shtm

Carrington, D. and Hecht, J. (2003) Worst ever power cut hits North America. *New Scientist,* 15th August. http://www.newscientist.com.article.ns?id=dn4062.

Chartered Institute of Management. (2002), Business continuity and supply chain management, http://www.inst-mgt.org.uk

Checkland, P. (1994) Systems theory and management thinking, *American Behavioral Scientist*, **38**, (1) September,75-91

Christopher, M. (2005) Logistics and supply chain management: creating value-adding networks. Pearson Education, Harlow.

Christopher, M. and Rutherford, C. (2004) Creating supply chain resilience through agile six sigma, *Critical Eye*, June-August, 24-28.

Christopher, M. et al, (2002), Supply chain vulnerability, Final Report on behalf of DTLR, DTi and Home Office, Cranfield University, Cranfield.

Civil Contingencies Act, (2004) http://www.legislation.hmso.gov.uk/acts/acts2004

Closs, D.J. (2004) Achieving an integrated focus on food security, *Logistics Quarterly*, **10** (4), November, http://www.lq.ca/issues /jan2005/articles/editorial.html

Closs, D. and McGarrell, E.F. (2004) Enhancing security throughout the supply chain, IBM Centre for Government, Special Report Series, April.

Collins English Dictionary (2000). Harper Collins, Glasgow.

Council for Supply Chain Management Professionals: http://www.cscmp.org/Website/aboutCSCMP/Definitions/Definitions.asp

Cranfield (2003) Supply chain risk: a self assessment workbook, Cranfield University/Department for Transport.

DETR (1998) Improving Distribution Efficiency through Supply Chain Co-operation, Energy Efficiency, Best Practice Programme, General Information Leaflet 47, Harwell.

Easton, G. (1995) Case research as a methodology for industrial networks: a realist approach, *Proceedings of the 11th International Conference of the IMP Group*, 7th -9th September, **1**, 369-388.

Ellram, L. (1991) Supply chain management: the industrial organisation perspective. *International Journal of Physical Distribution and Logistics Management*, **21**(1), 13-22.

Geary, S., *et al*. (2002) Uncertainty and the seamless supply chain, *Supply Chain Management Review*, , July/August, 52-61.

Göhl, L. (2003) The blackout in Eastern North America on August 14-15, 2003: could it happen here? Swedish Energy Agency (STEM).

Harrington, L.H. (2003) Welcome to the front line, *Transportation and Distribution*, January, 4.

Harvard Business Review (2006) Special Report: Preparing for a pandemic, May, 20-40.

Harvey, D. (2001) What lessons from foot and mouth? A preliminary economic assessment of the 2001 epidemic. Working Paper 63. Centre for Rural Economy Working Paper Series, University of Newcastle upon Tyne.

Haywood, M. (2002) An investigation into supply chain vulnerability management within UK aerospace manufacturing supply chains. MSc Thesis, Cranfield Centre for Logistics and Supply Chain Management, Cranfield University.

Haywood, M. and Peck, H. (2003) An investigation into the management of supply chain vulnerability in UK aerospace manufacturing. *Proceedings of the EUROMA/POMS Conference*, Cernobbio, Lake Como, June 16th-18th, **2**, 121-130.

Helferich , O.K. and Cook, R.L. (2002) Securing the supply chain. White Paper prepared for Council of Logistics Management, Oak Brook, IL, www.clm1.org

House of Lords, (2005) Science and Technology-Fourth Report, 7th December, United Kingdom Parliament

Jankowicz, A.D. (1995). *Business Research Projects (2nd ed).* Chapman and Hall. London

Laughton, M. and Watkiss, P. (2002) Narrow margins: addressing the issue of overcapacity in the UK electricity sector. Royal Academy of Engineering, London.

Lee, H.L.and Wolfe, M. (2003) Supply chain security without tears. *Supply Chain Management Review*, 2003, January/February,12-20.

Lipton, E. (2006) Ex-Fema leader faults response by White House, *New York Times*, 11th February.

Lowe, P., Edwards, S. and Ward, N. (2001) The Foot and mouth crisis: issues for public policy and research, Working Paper 64, Centre for Rural Economy Working Paper Series, University of Newcastle upon Tyne.

Lyons, G and Chatterjee, K. (2002) September 2000 fuel crisis: transport lessons form fuel tax protests of 2000, Ashgate, Abingdon.

McKinnon, A. (2004) Life without lorries: the impact of a temporary disruption of road freight transport in the UK. Report prepared for *Commercial Motor*, Heriot Watt University.

Mentzner, J. T. et al (2001), *Supply Chain Management*, Sage, Thousand Oaks, CA.

Miles, B. and Huberman, A. (1994) Qualitative data analysis: an expanded sourcebook. Sage, London.

PAS 56 (2003) Guide to business continuity management. Publicly available specification 56, British Standards Institute/Business Continuity Institute.

Food Standards Agency (2005a) Guidance on the general food law, Regulation 178/2002. 29th July http://www.food.gov.uk/foodindustry/consultantations/completed

Peck, H. and Jüttner, U. (2002), Risk management in the supply chain. *Logistics and Transport Focus* **4** (11), December, 17-22.

Peck, H. (2005) Opening the Way to Successful Risk Management in Purchasing and Supply. Report for the Chartered Institute of Purchasing & Supply. The Resilience Centre, Cranfield University, Shrivenham

Peck, H. et al, (2003) Supply chain resilience. Final report on behalf of the Department for Transport, Cranfield University.

Peck, H. (2005) Drivers of supply chain vulnerability: an integrated framework, *International Journal of Physical Distribution & Logistics Management*, **35**(4), 210-232

Rice, J.B. and Caniato, F. (2003) Supply chain response to terrorism: creating resilient and secure supply chains, Interim Report of Progress and Learnings, MIT, August.

Rice, J.B. and Caniato, F. (2003) Supply chain response to terrorism: creating resilient and secure supply chains, Interim Report of Progress and Learnings, MIT, August.

Rittel,H.W. and Webber, M.M. (1973) Dilemmas in a general theory of planning, *Policy Sciences*, **4**, 155-169.

Sheffi, Y. (2001) Supply chain management under threat of international terrorism, *International Journal of Logistics Management*, **12** (2),1-11

Sobel, J., Khan, A.S. and Swerdlow, (2002) Threat of a biological terrorist attack on the US food supply chain: The CDC perspective, *The Lancet,* London, March 9th, **359** (9309), 874-880.

Taylor, A. (2003), Concern at risk of winter power shortages, *Financial Times*, October 11th , 2.

White, D. (1995) Applications of systems thinking to risk management: a review of the literature, *Management Decision*, **33** (10), 35-45.

World Health Organisation (2002) Food safety issues: terrorist threat to food – guidance for establishing and strengthening prevention and response systems. World Health Organisation, Geneva.

Yin, R.K. (1989), Case study research, Sage, California.

Appendix A

The study methodology

Research design

The research design involves a single qualitative case study and takes the food and drink industry (not individual companies) as its primary unit of analysis. It follows the systemic industry-wide perspective that is similar in scope to an earlier Cranfield study of five tiers of military aircraft manufacturing supply chains (Haywood 2002). In line with Haywood's study a purposive sampling approach is also adopted i.e. organisations and individuals within them were selected because their knowledge typifies an important variety of viewpoints" (Jankowitcz 1995). A total of 28 organisations representing multiple tiers of food & drinks supply chains participated in this study. They were:

- 2 Large grocery retailers – i.e. supermarket chains
- 2 Large grocery wholesalers/distributors
- 3 Small independent retailers
- 9 Suppliers of 'Key Food Stuffs'
- 6 Suppliers of ingredients/condiments/joint ventures suppliers
- 2 Packaging suppliers
- 2 Transport providers
- 2 Representatives of industry associations (retail and distribution)

The original intention was to involve a higher number of suppliers of common ingredients. This was later revised, partly because some of the manufacturers of key categories remain vertically integrated businesses (e.g. bread or chilled foods), or the processing organisations retained control of incoming supplies through joint venture arrangements with large scale suppliers of commodities (imported fruit and vegetables or cereal producers). However, another factor here was that the largest ingredients suppliers are increasingly based outside the UK, presenting practical difficulties in accessing overseas management teams.

Selection and access

With the exception of the small independent retailers and industry associations, participating companies were mostly selected according to size of UK market share (usually the largest in each category). In most instances Mintel *Market Intelligence Reports* were used to identify preferred organisations. The retailers, wholesalers, transport, packaging and 'key category' suppliers, were all approached first via their respective industry associations who formally endorsed the study.

Ingredient suppliers were selected more on a convenience basis, but included dedicated subcontracted suppliers as well as specialist suppliers of core ingredients, such as sugar, and flour. Packaging suppliers and transport companies were also selected for size and their involvement with food retail distribution. The industry associations represent retail and distribution interests across the sectors.

A total of 61 managers representing 28 organisations were interviewed for this study. Further details are provided in Tables A1-A3. In addition, input was received from the largest US retailer. In the event some organisations offered four or more managers. Others were represented by only one person. In most instances this was a reflection of the difficulties involved in coordinating diaries rather than an unwillingness to contribute. In one or two instances it was because senior management confessed to having no formal business continuity plans in place, but were more than willing to provide details of 'risk management' or 'contingency planning' polices and practices within their organisations.

Collecting the data

Data collection for the study began in August 2005, starting with retailers and working back through the supply chains. The principle method was semi-structured interviews, lasting around 2 hours each. In most instances managers were interviewed separately at their own offices. In some instances other colleagues were called in to provide further information. Where only one representative of a company was available to participate in this study, supporting documentary evidence was often supplied by the interviewee. In other instances corroborating evidence came from other organisations operating in the same sector or the same supply chain.

Some interviews were tape recorded, but most were captured in hand written field notes, with summaries returned to the interviewee concerned for verification. Most summaries were returned some months after the initial interview, which allowed those concerned to update their responses as appropriate. Responses were collated using a bottom-up approach i.e. by individual interviewee, within organisation, and finally cross-supply chain and industry.

The questions

An interview schedule with 19 questions (Appendix B) was used to lend focus to the semi-structured interviews. The questions reflect the terms of reference covering the scope, purpose and organisation of business continuity management within the organisations consulted. They also cover the identification of operational failures, near misses, and known weaknesses, together with questions on approaches to risk and supply chain management.

Organisation Category	Food Category	Title/role	Number of interviews	Date of interviews
Supermarket 1	All	Legal & External Affairs Manager Company Secretary Head of Risk Management Retail Managing Director	4	27.9.05
Supermarket 2	All	Head of Regulatory Policy Group Loss & Security (Operations) Group Support Manager Loss & Security	3	24.10.05/ 6.1.06
Small independent stores (3)	All	Owner/sole trader Managing Director Managing Director	Focus Group Completed (3)	2.2.06
Wholesale/ Distributor 1	All	Project Coordinator Logistics Programme Manager Customer Relations Manager Group Quality Assurance Manager	4	10.08.05
Wholesale/ Distributor 2	All	Supply Chain Director Health & Safety Manager Project Manager (Distribution) Director of Quality Assurance	4	17.08.05
US retailer	All	Head of Emergency Planning	1*	20.6.06 + published sources

Table A-1. Interviews Undertaken – Retailers and Wholesalers.

Organisation Category	Food Category	Title/role	Number of interviews	Date of interview
Supplier 1	Bottled Water	Scientific and Public Affairs Director Supply Chain Director IT Manager	3	23.01.06
Supplier 2	Bottled Water	Head of Supply Chain & Purchasing	1	10.3.06
Supplier 3	Bread	Distribution Director Internal Business Planning Manager	2	10.1.06
Supplier 4	Milk	Risk & Financial Planning Manager Quality Director	2	27.4.06
Supplier 5	Infant formula	Supply Director Manager Technical Development & Business Affairs	2	13.3.06
Supplier 6	Tinned food	Director of IT & Change Management	1	14.3.06
Supplier 7	Frozen	Operations Director (UK) Business Risk Manager	2	5.1.06
Supplier 8	Chilled (with meat)	General Manager (Distribution) Head of Purchasing General Manager (Planning) Development Services Manager	4	12.4.06

Table A-2. Interviews Undertaken – Suppliers of Foodstuffs (continued below).

Organisation Category	Food Category	Title/role	Number of interviews	Date of interview
Supplier 9	Misc. Food & Drink	Business Risk & Continuity Manager Supply Chain & Systems Director	2	7.11.05 15.2.06
Ingredient 1	Four	Divisional Commercial Relationship Manager Head of Procurement	2	10.1.06
Ingredient 2	Sugar	Distribution Manager (Europe) Customer Services Manager (Europe) Master Scheduler	3	21.3.06
Ingredient 3	Fresh milk	Customer Relations Director Director of Sales Company Secretary	3	6.2.06
Ingredient 4	Spices, seasonings & flavourings	Logistics Director	1	23.6.06
J/V Supplier 1	Fresh fruit & vegetables (imported)	Supply Chain Manager Financial Controller Business Process Manager	4	22.3.06
J/V Supplier 2	Cereal	Supply Chain Director Quality & Regulatory Affairs Director	2	17.2.06

Table A-2. Interviews Undertaken – Suppliers of Foodstuffs.

Organisation Category	Food Category	Title/role	Number of interviews	Date of interview
Transport 1	All	Retail Managing Director	1	12.1.06
Transport 2	All	Project Director Divisional Director (Food Retail) Business Continuity Planning & Risk Process Manager Director of Risk Management	4	11.11.05
Packager 1	Plastic &bottles	Managing Director (Europe)	1	25.4.06
Packager 2	Flexible packaging	Deputy Chief Executive	1	3.5.06
Industry Association 1	Retail	Head of Technical Services	1	24.5.06
Industry Association 2	Distribution	Chief Executive	1	5.5.06

* US retailer confirmed cooperation pre-Hurricane Katrina. Comments forwarded June 2006.

Table A-3. Interviews Undertaken – Transport, Packaging and Industry Associations.

Appendix B

Resilience in the Food Chain: A Study of Business Continuity Management in the Food and Drink Industry – Interview Schedule.

Part 1. Interviewee Profile & Business Continuity Management within the Organisation

Q. 1. In your present role how heavily involved are you in Business Continuity Planning (BCP)/Business Continuity Management (BCM) - including contingency planning, crisis management, risk management etc**?**

- Who is responsible for BMP/BCM (individual/dept/everyone?)
- Does the company have planning at site level and/or high level crisis management teams?

Q. 2. To what extent are supply chain specialists (e.g. purchasing, logistics, operations) formally involved in BCP/BCM?

Q. 3. Drivers - why is the company doing BCM – has the rationale/remit changed?

- How long has the company been actively engaged in BCM?
- What prompted this? – has the overall emphasis changed?

Q. 4. What BCM/risk management processes/approaches/tools are in use to identify and assess threats/risks?

- General approaches e.g. register; likelihood x impact matrix; TQM/SCM tools (manual or computerised?)?

Part 2. Disruptions, Near Misses and Known Weaknesses

Q. 5. What do you think could seriously derail operations?

- Any experience of actual disruptions?
- Any near misses?
- Any known weaknesses?
- Does the company record incidents and near misses or formally capture and disseminate 'lessons learned?'

Q. 6. Are you aware of specific events or circumstances that the company <u>does</u> plan and make provision for? – if so what?

- Is the planning around in-house vital operating assets? – e.g. site, IT (is there a UPS?), key staff etc. or is it 'mission critical activities'?

- How often does it update B/C planning/procedures?

- Are they tested – i.e. full scale drills?

Q. 7. What are the limitations of BCP/M (inadvertent/ policy) – any situations that the company chooses not to make provision for?

- Other than nuclear war!

Part 3. Widespread Systemic Disruptions

Q. 8. What would company policy be if an outbreak of a potentially life threatening contagious disease (e.g. SARS or Avian/Pandemic Flu) was identified at a location close to a company site, or one where employees would normally travel in the course of their everyday duties?

Q. 9. What would the company's position be in the event of a wide-spread power outage?

Q. 10. If necessary could the business revert to and run on paper-based systems?

Q. 11. How long could the company maintain operations if movement of goods between sites was stopped or seriously impaired?

- Stock holdings of essential items (for the company's operations)?
- Inventory holding/stock levels/ (at manufacturing site & DC)?
- Shelf life of stocks?
- What would run out first?
- Would storage of finished goods or waste disposal problems halt operations?

Part 4. Stocks and Inventory Management

Q. 12 Are the changes planned within the company likely to affect levels of inventory holdings/policies?

Q.13. Does the company have data on panic buying patterns for key categories of product?

Q. 14. What would be the recovery time/replenishment lead-time?

- Under normal circumstances and after surge e.g. panic buying?

Part 5. BCM Beyond the Single Firm?

Q. 15. Would the loss/failure of any class of supplier(s) operations halt yours? If so which ones?

Q. 16. Does the company require suppliers (some or all) to engage in business continuity management or planning for supply chain disruptions?

- With this company?

- On its own

- With your suppliers?

- Do the company require evidence of provision/planning?

- Priority contracts – does the company demand them and/or is it bound by any?

Q. 17. Would the company be in a position to provide support to one (or more) major customers if the customer(s) experienced a serious operational failure – have you done so in the past? Could you again?

- Does the company actively engage with customers (or even competitors?) in business continuity management?

- Is BCM a requirement of the company's customers – what evidence of compliance is provided?

Q. 18 Does the company have any direct links with emergency planners?

Q. 19. Is there anything else that you feel is important that has not been covered in this interview?

Appendix C

TOP 150 SELLING LINES – NOVEMBER 2005

Product	Top
Own label 2Pt Fresh Semi Skimmed Milk 1.14Ltr	**50**
Cadog 2 Pint Welsh Pasteurised Semi Skimmed Milk	**50**
Own label Fresh Semi Skimmed Milk 1 Ltr	**50**
Own label 4Pt Semi Skimmed Milk 2.27Ltr	**50**
Cadog 4 Pint Welsh Pasteurised Semi Skimmed Milk	**50**
Own label Fresh Semi Skimmed Milk 2Ltr	**50**
Own label Fresh Semi Skimmed Milk 568ML	**50**
Cadog 1 Pint Semi Skimmed Milk 568ML	**50**
Carrots Loose Per Kg	**50**
Silver Spoon Granulated Sugar 1Kg	**50**
Own label 2Pt Fresh Whole Milk 1.14Ltr	**50**
Cadog 2 Pint Welsh Pasteurised Whole Milk	**50**
Own label Fresh Whole Milk 1Ltr	**50**
Tomatoes Loose Per Kg	**50**
Hovis Square Cut White Med Sliced 800G	**50**
On	**50**
Own label Washed White Potatoes 2.5Kg	**50**
Own label Fresh Whole Milk 568ML	**50**
Ca ML	**50**
CDF Medium Petit Pain Each	**50**
Closed Cup Mushrooms Kg	**50**
Own label Whole Cucumber Each	**50**
White Seedless Grapes Per Kg	**50**
Own label Iceberg Lettuce P/P Each	**50**
Own label Thick White Sliced 800G	**50**
Own label Cauliflower Each	**50**
Muller Fruit Corner Strawberry Yog 175G	**50**
Baking Potatoes Per Kg	**50**
Own label Spring Onions Bunch	**50**
Lemons Loose Each	**50**
Own label Every Day Pure Orange Juice 1Ltr	**50**
Wiltshire Style Cured Ham 2.72Kg	**50**
Coca Cola 2Ltr	**50**
L&B King Size 20S	**50**
Own label Small Bananas Pack	**50**
Own label Lean Beef Steak Mince 2.59 500G	**50**
Royal Gala Apples Loose Per Kg	**50**
Clover Orig Dairy Spread 500G	**50**
Heinz Baked Beans/Tom 415G	**50**
Muller Fruit Corner Pied Cherry Yog 175G	**50**
Muller Light Strawberry Yogurt 200G	**50**
Own label Medium Eggs From Caged Hens 6S	**50**

Product	Top
Hovis Thick White Sliced Loaf 800G	**50**
St Ivel Utterly Butterly 500G	**50**
L&B King Size 10S	**50**
Hovis Wholemeal Med Sliced Bread 800G	**50**
Harris Unsmoked Back Bacon 200G	**50**
JP Superkings 20S	**50**
Hovis Square Cut Thick Loaf 800G	**50**
Walkers Ready Salted Crisps 34.5G	**50**
Rizla Regular Green Papers	**50**
Anchor Butter 250G	**50**
Own label Scotch Pancakes 6S	**50**
Coca Cola Contour Bottle 500ML	**50**
Own label Pure Orange Juice 1Ltr	**50**
Coca Cola 330ML	**50**
Nescafe Original Instant Coffee 100G	**50**
Mars Bar 62.5G	**50**
Bananas Loose Per Kg	**75**
Own label 4Pt Fresh Whole Milk 2.27Ltr	**75**
Own label Fresh Whole Milk 2Ltr	**75**
Own label Medium White Sliced Loaf 800G	**75**
Cadog 4Pt Welsh Pasteurised Whole Milk	**75**
Cadog 6Pt Welsh Pasteurised Semi Skimmed Milk	**75**
Own label Fresh Semi Skimmed Milk 3 Ltr	**75**
Own label 6Pt Semi Skimmed Milk 3.41Ltr	**75**
Broccoli Loose Per Kg	**75**
Own label Cucumber Portion Each	**75**
Navel Oranges Each	**75**
Own label Everyday White Sliced Medium 800G	**75**
Own label Medium Free Range Eggs 6S	**75**
Heinz Baked Beans/Tom Sauce 200G	**75**
Diet Coke 2Ltr	**75**
Hovis Bob Medium 800G	**75**
Can’t Believe Not Butter! 500G	**75**
Muller Crunch Corner Vanilla+Choc Rice Yog	**75**
Ginsters Original Cornish Pasty 227G	**75**
Elmlea Double Cream 284ML	**75**
Own label Large Eggs From Caged Hens 6S	**75**
Peperami Standard Snack 25G	**75**
Bernard Matthews Wafer Thin Turkey Ham 170G	**75**
Willow Dairy Spread 250G	**75**
Own label Extra Thick White Sliced Loaf 800G	**75**
Walkers Ready Salted Crisps 6X25G	**75**
B&H Gold 20S	**75**
Walkers Cheese+Onion Crisps 34.5G	**75**
Fresh 'n' Lo Semi Skimmed Milk Tetra Top 1Ltr	**150**
Own label 2Pt Fresh Healthy Living 1.14Ltr	**150**

Product	Top
Swedes Loose Per Kg	**150**
Own label Closed Cup Mushrooms P/P 250G	**150**
Conference Pears Per Kg	**150**
Own label Cherry Tomatoes 300G	**150**
Hovis Square Extra Thick Sliced White 800G	**150**
Own label Fresh Whole Milk 3 Ltr	**150**
Cadog 6 Pint Whole	**150**
Own label 6Pt Whole Milk 3.41Ltr	**150**
Braeburn Apples Loose Per Kg	**150**
Own label Healthy Living Skimmed Milk 568ML	**150**
Own label Round Lettuce P/P Each	**150**
Own label 4Pt Fresh Healthy Living Skimmed Milk 2.27Ltr	**150**
Own label Fresh Healthy Living 2Ltr	**150**
Parsnips Loose Per Kg	**150**
Red Peppers Each	**150**
Own label Tomatoes/Vine Pack	**150**
Cotswold Cooked Ham 2X2.35Kg	**150**
Own label Large Free Range Eggs 6S	**150**
Own label Broccoli P/P 350G	**150**
Own label Fair Trade Bananas Per Kg	**150**
Golden Delicious Apples Per Kg	**150**
Own label Everyday Small Eggs 10S	**150**
Puffin Tuna Chunks in Brine 185g	**150**
Muller Fruit Corner Peach/Apricot 175G	**150**
Roast Chicken Small Each	**150**
Own label Everyday Baked Beans 420G	**150**
Dairy Gate Traditional Country Butter 250G	**150**
Own label Baby New Potatoes P/P 750G	**150**
Premium Bread Ham 2X2.90Kg	**150**
Own label Longlife Medium Sliced Loaf 800G	**150**
Muller Fruit Corner Blackberry/Raspberry 175G	**150**
Own label Everyday Lemonade 2Ltr	**150**
Richmond Superkings 20S	**150**
Heinz Cream Of Tomato Soup 400G	**150**
Muller Light Cherry Yog 200G	**150**
Muller Light Toffee Yog 200G	**150**
Mayfair Kingsize F/M 20S	**150**
Muller Light Raspberry/Cranberry 200G	**150**
Kelloggs Cornflakes 500G	**150**
Windsor Blue Superkings 20S	**150**
Own label Fresh Double Cream 284ML	**150**
Own label Sparkling Lemonade 2Ltr	**150**
Diet Coke Contour Bottle 500ML	**150**
Own label Lean Beef Steak Mince 1.59 250G	**150**
Horlicks Farm Extra Mature Cheddar 200G	**150**

Product	Top
Heinz Baked Beans 150G	**150**
Wriggleys Extra Peppermint 10Pk	**150**
Weetabix Biscs 24S	**150**
Richmond 8 Irish Thick 454G	**150**
Own label Sparkling Diet Lemonade 2Ltr	**150**
Mcvities Jaffa Cakes 12S	**150**
Own label Soft White Finger Rolls 6S	**150**
Nimble Medium White Sliced Loaf 400G	**150**
Own label Baked Beans/Tom Sauce 420G	**150**
Walkers Quavers Cheese 20G	**150**
Evian Natural Mineral Water 50CL	**150**
Own label Bakers Choice Crumpets 6S	**150**
Anchor Mature Cheddar 200G	**150**
Honey Roast Ham 2X2.95Kg	**150**
Flora Light Spread 500G	**150**
Lucozade Energy Original 380ML	**150**
Pot Noodle Chicken+Mushroom 89G	**150**
Nimble Wholemeal 400G	**150**
Fairy Liquid Original 500ML	**150**
Pork Farms Medium Pork Pie Each	**150**
Wriggleys Extra Sugar Free Spearmint 10 Each	**150**
Andrex Bathroom Tissue Pure White 4Roll	**150**
Cadburyland Freddo 10P Standard	**150**
Own label Everyday Fresh Beef Mince 1.09 500G	**150**
Muller Light Vanilla Yogurt 200G	**150**
Felix Rascals Cod/Haddock 100G	**150**
Whiskas Supermeat Rabbit 390G	**150**
Own label Chopped Tomatoes 400G	**150**
Own label Fresh Mince Beef 1.39 500G	**150**
Walkers Prawn Cocktail Crisps 34.5G	**150**