Public perception of risks associated with major accident hazards

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Public perception of risks associated with major accident hazards

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This research was designed to provide the Health and Safety Executive (HSE) with a better understanding of the nature and dynamics of public perceptions of the risks associated with major hazard sites in the light of current policy developments and debates. It consisted of a series of case studies conducted around seven different major hazard sites and utilised a qualitative research design that involved people living close to such sites taking part in focus group discussions and completing a Q-sort exercise. The results of the research highlight the influence of local context on public perceptions of major hazard sites and outline the ways in which members of the lay public reason about the associated risks. The analysis differentiates the bases of public toleration of hazardous industrial sites and accounts for their distribution across different local contexts. The report also documents the public’s views of a number of policy issues, including the provision of risk information, the regulation of major hazard industry and the use of land use planning controls. The report concludes with a discussion of the implications of the research for policy, giving particular attention to the Seveso II Directive and forthcoming COMAH Regulations, and to the HSE's Tolerability of Risk criteria.

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EXECUTIVE SUMMARY

THE RESEARCH PROJECT

The overall aim of this research project was to help the HSE and other Government departments responsible for developing and operating controls over major accident hazards achieve a better understanding of public perceptions of the risks associated with these sites. It was intended that the research would inform discussions about a number of policy issues related to the regulation of risk at major hazard sites. These include strategies for communication with members of the local public, the new requirements for public consultation and participation under the Seveso II Directive and the setting of tolerability criteria for regulatory purposes.

The project studied public perceptions around seven different major hazard sites, which varied considerably in scale. The mix of sites presented both toxic and flammable hazards, some of which were CIMAH ‘top tier’ and some NIHHS sites. They included three chemical production sites, a major petrochemical complex, an oxygen enrichment and bottling plant, an LPG store and a water treatment works. The sites were spread across the country, from Tyneside to the Hampshire coast and from North Wales to Yorkshire.

The study was based primarily on a series of focus group discussions with local residents living within the consultation or public information zone around each site. The focus group discussions included the use of land use planning scenarios to explore a number of policy issues. Participants also completed an additional exercise (called a Q-sort) designed to elicit their views about the local site. Background research at each site included interviews with site operators, regulators and other key local actors, as well as research in local archives.

GENERAL OBSERVATIONS

• We were given the task of researching people’s perceptions of the risks from major accident hazards - but views about accident risks were not formed separately from views of other aspects of the sites, or from more general views about companies, government and regulation. It is therefore important not to focus exclusively on accident risk but to set this in a wider context.

• We found some common patterns of perceptions and attitudes across all the sites, but also important differences between sites. Local factors, such as the nature of the different types of sites, their histories and their roles in the local area, were found to be of particular importance when accounting for these differences. One clear practical implication is that none of the bodies responsible for risk management can afford to be insensitive to such contextual realities.

• For most people living near to major hazard sites they are seen as part of their daily life. We found, however, that this does not mean that people have no concerns, that they are happy about living at risk, that they trust those who are in charge of safety, or that they are actively accepting or tolerating the risk.
PUBLIC PERCEPTIONS AND ATTITUDES

Public perceptions are informed and shaped by interactive processes of reasoning and argumentation, whether explicit or tacit, which operate in particular social and geographical contexts and draw upon various cultural resources and forms of ‘evidence’. Thinking about risk perceptions in terms of context, evidence and reasoning is a useful way to develop our understanding of how local people construct their views of major hazard sites.

Context

One of the key components of the perspective we have drawn on and developed in this project is the significance of context for understanding risk perceptions. We maintain that context is always a central factor in the formation of risk perceptions since risks are never defined and experienced in isolation from other issues and questions. A contextual view produces a more complex picture but it is one that needs to be appreciated if we are to understand and account for local responses to the risks associated with the sites.

In general levels of public awareness and concern about risk were higher around the major chemical production sites and lower at the oxygen plant, LPG depot and water treatment works. Sites also figured very differently in the identity of the locality and in local people’s feelings about the place. In some cases the site had grown with the community over many years and been a significant local employer; while in others it had a much lower profile. In only one case, where there had been a major chemical fire and a long-standing problem of unpleasant odours, was there a significant sense among local people of stigma associated with the presence of the site.

Evidence

We found that when making judgements about the risks associated with the local major hazard site, people drew on diverse forms of ‘evidence’ and information. Among the most significant were:

- local memories of more historical incidents or developments at the site;
- first-hand experience of incidents and emergencies;
- the various forms of sensory ‘evidence’, particularly smells and things that they had seen (or sometimes not seen); and
- people’s interpretation of the CIMAH and company information that was issued at some sites.

Views of the local media as a reliable source of information were mixed, although it was also evident that not everyone recalled issues and developments that had been covered in the local press.

Risk reasoning

It was clear from the focus groups that people’s views were often provisional and negotiated in the course of discussion. It was also clear, counter to the often-made criticism that public responses to risk are ‘irrational’, that people reasoned about risk in quite complex ways – albeit ways that were different to those employed by risk experts. Many people drew on analogies with their own experience of risk and regulation in their workplace or made comparisons with
risk events in other industries and places. Arguments tended to focus more on the consequences of a major accident than on the probability of it happening. Perhaps most striking was the fact that many members of the public framed the issues in moral rather than technical or economic terms. They often perceived their position to be at odds with those of both planners and industry. There was, however, recognition of the social and economic pressures that constrain decision making and people were capable of sophisticated evaluations and compromise in the face of what they saw as a social dilemma.

Local toleration of risk from major hazard sites

The results of the Q-sort exercises, as interpreted alongside the focus group data, enabled us to identify a series of ‘points of view’ related to the toleration of risk. Among the views that emerged we found the strongest, most unequivocal and most widespread to be characterised by distrust, a sense of vulnerability and worry, and a sense of powerlessness to influence the situation. For the purposes of comparison, we can characterise this point of view as expressing a lack of toleration.

There were also people who adopted a more tolerant attitude towards the sites. The bases for such toleration were far more differentiated than for the ‘intolerant’ view. The most widespread of these was an ‘habituated’ viewpoint that saw the site as being part of everyday life and which appeared to be based, variously, on pragmatism, stoicism, dependency or resignation. Other, less frequent expressed arguments conveyed a more provisional toleration of the sites that was based on: trust in the company (strongest among those with employment links), economic trade-offs (but only where the site was a significant local employer), faith that the regulatory authorities were ensuring public protection and, finally, the argument that individuals choose where they live and could leave the area if they felt themselves to be at risk. The stability and robustness of public toleration, particularly when based primarily on a single criterion, is more likely to vary in the event of organisational changes (for example, in employment practices) or incidents at the site.

POLICY AND PRACTICAL ISSUES

In addition to the investigation of perceptions of the local major hazard sites, the research also involved participants in discussing a number of related policy issues. On the basis of the research we can make some general observations.

Regulation and participation

We found almost universal support for strong regulation of industry. Evaluations of regulators themselves were made according to two main criteria:

- the extent to which they were perceived to act in the public interest, with the notion of independence from industry and from political interference paramount; and
- their ability to be effective in regulating or scrutinising safety

If regulators wish to ensure their public credibility, therefore, these issues merit close consideration. It was also notable that there were mixed views about increasing public participation in the regulatory process and a general feeling of dependence on experts to assess safety.
Regulation and the HSE

The HSE role in hazard regulation was recognised to an extent amongst the members of the public involved in the research, particularly where there had been a HSE investigation following an incident. However, there were also many people who were vague about the HSE’s role and its regulatory practices. Where the HSE was discussed, it was evaluated more in a positive than a negative manner. Key criteria used by participants to evaluate the HSE were:

- its independence from government and industry,
- the degree to which it was proactive,
- the effectiveness of inspection practice and
- its level of expertise.

In making judgements about the HSE we found that people drew heavily on their own workplace experience. These evaluations and criteria have implications for the extent and manner of any greater HSE involvement in local risk communication activities with the general public and their political representatives. In general they suggest that the nature of regulation should be given a higher profile in public communications. More specifically, and in relation to particular areas of expressed public concern, the following points can be made:

- activities where the HSE could be seen as being too closely linked with industry may detract from perceptions of the HSE’s independence.
- the HSE needs to be able to explain and defend inspection practices, particularly in relation to the issue of prior notice.
- the specialisation represented by the formation of the Chemical and Hazardous Installations Division within the HSE should be emphasised in any communication initiatives, alongside explanations of the inspection and scrutiny carried out at major hazard sites.

Land use planning

In the focus group discussions of risk-related land use planning scenarios, we found strong support for land use planning controls, but relatively little trust in local planning procedures to ensure public safety. The responses that people made in relation to hypothetical siting issues took varying (and sometimes variable) forms, ranging from moral rejection to more pragmatic compromise and the application of a principle of informed choice. In terms of policy issues we identified various factors that supported the current advisory relationship established between HSE and local planning authorities. HSE policies on giving advice to local planning authorities on development near to hazardous sites and the inclusion of societal risk concerns in the assessment of risks, were also lent support by participants’ responses to the decision making scenarios. The potential environmental consequences of a major accident rarely figured as a significant issue.

Communication and information

Many of the people in our study did not feel well informed. They saw industry in general and the operators of their local major hazard site as secretive and not forthcoming with honest information. Suspicions of secrecy were closely linked to a lack of trust. There was strong support for public rights to information, in terms of both emergency action information and the right to know that one is living in an area at risk. This latter point was often made in relation to issues of residential choice and was associated with an insistence that potential residents should
be informed prior to making a decision to move into the area. Where active communication by site operators had been taking place, this was sometimes well received, but also treated with scepticism and doubts over the extent to which companies were being genuinely open. CIMAH information was often viewed in the context of general community relations material, which tended to increase scepticism about its motivation and effectiveness. The various new provisions of the Seveso II Directive regarding public access to information and public consultation accord with public concerns. Some of the provisions, such as public access to safety reports may serve a symbolic as well as a practical function and have potentially significant impacts on communication practice and site-community relationships.

Whilst people may not feel well informed about activities at major hazard sites and the risks they present, this does not mean that they lack information and knowledge on which to draw. Local ‘evidence’ forms a body of informal risk communication that influences public perceptions of a site and the range of risks it presents. Formal risk communication about major accident hazards does not take place in a vacuum. There is a history, a local context, a body of existing knowledge and concerns and a set of pre-existing relationships within which risk communications are received and interpreted, all of them subject to change over time. We conclude therefore that formal risk communication for major accident hazards:

- needs to be seen as a long term and ongoing process,
- needs to be sensitive to the context within which the major hazard site and the risks it present are set, and
- needs to recognise and actively engage with the various form of local knowledge relating to the major hazard site.

TOLERABILITY AND TOLERATION

Three decades of risk perception research have clearly established that members of the public do not think about sources of risk solely or even substantially in terms of statistical probabilities. It follows that any search for a quantified index of what ‘the public’ (however that term is defined) deems to be a statistically acceptable or tolerable level of risk is futile. There is also a considerable difference between asking people to think about risk in abstract terms and asking them to think about a real risk, in a real location, at a particular point in time. ‘Toleration’ we would argue refers to the real, local and contextualised responses to specific risks, which we have explored in this project. In contrast the term ‘tolerability’, developed within the evolving Tolerability of Risk (TOR) framework, refers to an abstract principle applied at a societal level. For this reason, it is not a straightforward matter to move from toleration to tolerability - from the contextual to the abstract - in order to draw conclusions from this research of direct applicability to the TOR framework.

Although across the case studies a small minority of people expressed a strong desire to see their local site shut down, it is reasonable to conclude that there is, in general, a pragmatic resilience in the face of risk and uncertainties. As we have already noted, however, even where people appear to tolerate living with risk day-to-day, it is not necessarily accompanied by a high level of trust in the operators of hazardous plants to control risks and prevent accidents from happening. Neither can we conclude that it is universally based upon the ‘active recognition of benefits’ and ‘confidence in control measures’ that the commonly accepted definition of tolerability implies. Rather, our evidence indicates that a lack of toleration of the risks presented by major hazard sites is widespread, particularly around chemical plants, and likely to be relatively resistant to change. In contrast, tolerant viewpoints are more differentiated, less prevalent, may be more susceptible to change and are more locally contingent. This indicates that the task of managing major accident hazards will continue to be
a politically and socially difficult one. The context and practice of risk regulation, management
and communication will present an evolving set of challenges, particularly in situations of
heightened local sensitivity to risk.

In conclusion, the results of this research project are presented here with the aim of offering an
insight into the dynamics of public perceptions and of raising issues that can usefully inform
discussion among those involved in the management of the risks presented by major hazard
sites about the future development of both policy and practice.
1. INTRODUCTION

1.1 PROJECT AIMS AND OBJECTIVES

The overall aim of this research project was to help the HSE and other Government departments responsible for developing and operating controls over major accident hazards, to achieve a better understanding of public perceptions of the risks associated with these sites.

The following more specific research questions defined the remit of the project:

- to what extent are members of the public aware of major hazard sites and the risks they present?
- how do members of the public perceive the risks from major hazard sites and the measures taken to control and manage these risks?
- to what extent and on what basis do members of the public tolerate the risks from major hazard sites?
- what factors can explain patterns of risk perception and toleration?
- what implications for the development of risk criteria and the regulation and management of major accident hazards arise from the observed patterns of risk perception and toleration?

These questions have been addressed by undertaking comparative research at seven major hazard sites, allowing the project to take account of the diverse characteristics of major hazard sites and the places and communities within which they are located.

1.2 MAJOR ACCIDENT HAZARDS

Major accident hazards can be broadly defined as the storage or use of hazardous substances, where in the event of a major accident and release of toxic, explosive or flammable materials local people and the nearby environment could be seriously affected. They are identified in the regulatory regime enforced by the HSE and other government bodies as a distinct and separate category of risk.

Accidents at major hazard sites rarely happen, but the potential hazard or threat has been demonstrated in a number of major disasters, for example at Flixborough in 1974, Seveso, Italy in 1976 and Bhopal, India in 1984. There have also been a number of smaller scale incidents at a range of sites in the UK, including chemical processing plants, warehouses and liquefied petroleum gas depots. Such accidents can have a range of impacts on humans and the environment, but these are largely spatially restricted to the vicinity of the installations involved. Significant wider social and economic effects can however also be experienced in the wake of accident events.

Sites presenting a potential major accident hazard are broadly spread across the UK although there is distinct clustering in areas that have a concentration of the chemical and/or petrochemical industry. In some cases sites are remotely located with few people living near to
the site and potentially at risk from an accident event. In others, sites are located within urban areas with many people living or working within areas at risk. For such people, major hazard sites may be very conspicuous and long standing features of the local area and important local employers, or relatively anonymous installations, physically and economically insignificant to the local community. It is the population living in areas potentially at risk from accident events that forms ‘the public’ we have researched in this project.

1.3 PUBLIC PERCEPTIONS AND POLICY RELEVANCE

There have been many advances in the control and management of major accident hazards and expertise in dealing with the risks posed has progressed considerably within industry, central government bodies and local authorities. However, only comparatively recently has the public started to figure more centrally in the considerations of both policy makers and practitioners. The Seveso Directive and UK CIMAH regulations marked an important first step in requiring the distribution of information on risks and emergency actions to people living in the vicinity of major hazard sites. Beyond legislative requirements, industry has also recognised the importance of addressing public concerns; for example, by formulating good neighbour policies, holding open days and setting up local liaison committees. Public reactions to accident events have also raised questions about the basis of perceptions of risk. For example, the different local reactions to major accidents in Bradford and Castleford in 1992 stimulated discussions that in part lead to this project being commissioned.

In addition, broader questions regarding public perceptions of risk have been raised across government by a series of high profile risk issues and by attempts to achieve greater compatibility and consistency in the way in which different areas of risk regulation are being carried out by different government departments.

For these reasons there are a number of areas of policy for which questions of public risk perception and the results of this project are of direct relevance. These include:

- the development of the HSE ‘tolerability of risk’ framework
- the formulation of risk criteria used by the HSE for land use planning advice and other purposes, where the need to take some account of public perceptions alongside expert assessments has been recognised
- the provision of emergency action and hazard information to members of the public living near to major hazard sites under the requirements of the CIMAH Regulations
- requirements under the Seveso II Directive and forthcoming COMAH Regulations for public consultation in land use and emergency planning and rights of access to safety reports
- policy steps intended to improve public trust and confidence in regulatory bodies, including questions of best practice in risk communication and freedom of information

The need for a substantial research project to inform these areas of policy and practice was recognised by the HSE in the context of a limited existing UK research base. Whilst there has been some research addressing public views of major hazard sites, which we discuss in chapter 2, this work has been rather sporadic and often focused more on risk communication practice than on risk perception. The current project was intended to provide a more thorough and
detailed study of public perceptions of major hazard sites in a comparative setting, which would also draw on recent theoretical and conceptual advances in understanding risk perceptions and how they are formed.

1.4 THE APPROACH TO THE RESEARCH

It is possible to distinguish a number of different approaches to the understanding of risk perceptions, deriving from at least a decade of intense intellectual debate on both sides of the Atlantic. One approach that has recently received greater attention and recognition is the cultural approach, which the Royal Society (1992) report on risk notes "has become established as a major contributor to the risk debate", further commenting that "the issues it has raised are crucial for the future of the field". This approach begins from the premise that risk attitudes are socially constructed rather than individually held. Risk perceptions are inextricably embedded in the broader social context within which they are formulated, in a way that is simply not captured in much of the psychological research on the subject (see chapter 2 for further discussion).

It is this theoretical background that our research has drawn upon and sought to further develop. A socio-cultural approach to understanding risk perceptions was considered appropriate to the aims and objectives of the project for a number of reasons:

- major hazard industry is an integral part of the UK economic, social and physical landscape. To divorce the risks it presents from this context would be to create an artificial detachment from the setting in which local attitudes to risks are developed and held. This setting can have a long history with sources of risk simultaneously representing important sources of employment, wealth and social structure.

- it can provide a richer and more sensitive understanding of risk perceptions and how they vary between different subgroups within society

- it can help identify the specific factors which affect the uptake and effectiveness of public information for different purposes (e.g. emergency planning, land use planning) and thus define realistic good practice measures

- it can help allay 'destructive surprises' for authorities by alerting them to sometimes fundamentally different logics held by lay people, often for good reason to do with factors in their local and historical context, but which may be overlooked from a perspective assuming 'universal' principles

In addition to recognising the contextual and social basis for understanding risk perceptions we have also adopted an approach to analysing perceptions which sees attitudes as arguments rather than as properties of an individual. This interactive, dialogical perspective stands in contrast to the established psychometric paradigm, which has conveyed a more static, cognitive view of risk perceptions based on the characteristics of the hazards themselves.

In line with our approach to the research task, we have not focused exclusively on perceptions of major hazard risk itself. Rather we have explored the interaction of risk perceptions with attitudes towards other aspects of industry, the local area, regulatory bodies and the broader social and economic context within which the local community is situated. The research was not designed to test the 'correctness' of public perceptions of risk against any expert definition of a statistical level of risk, nor has it assumed a distinction between the 'subjectivity' of public
perceptions and the 'objectivity' of expert views. Instead, we have taken public views at face value and used research methods which as much as possible allow people to define risk and other relevant matters in their own terms. The research design, involving a combination of focus groups and Q-method, presents an innovative and distinctive approach to research in this field (see chapter 3).

Within the overall aims and objectives of the project, we proposed at an early stage to explore a number of issues identified by recent risk research in the US and UK as relevant to the understanding of public perceptions. In this respect we particularly sought to:

- examine the extent to which there was a diversity or consistency of perception amongst different "publics", rather than seeking only some average view of a presumed homogenous 'local community'.

- explore the differing roles of national and local level influences on risk perceptions. This provides an interface to debates within, for example, planning circles as to the relative roles of national and local level risk decision making for industrial hazards.

- examine the influence of credibility and trust in industry and regulators on public risk perceptions. These are now considered to be a central concern by those working from a social perspective.

- examine the role of the individual’s sense of being able to influence the situation (often referred to as their 'sense of agency') upon their interest in and willingness to take up information about hazards and emergency arrangements.

These four particular research foci were each found to be relevant to understanding patterns of risk perception within the seven case study areas. However, other factors also emerged more directly from the data (for example, the importance of fairness and equity) and were therefore given equal attention in the analysis and interpretation that was carried out.

1.5 STRUCTURE OF THE REPORT

The report is organised into eight chapters. Chapter 2 discusses issues arising from the recent research literature on risk perception, including studies specifically relating to major accident hazards, and establishes the importance of the socio-cultural approach adopted in this project. Chapter 3 outlines the research design that was chosen to carry out the research. The different research methods are described, along with a discussion of the site selection criteria used to choose the seven case studies. Chapter 4 provides background information on each of the case study sites and their localities, outlining the historical, spatial, economic and social context within which the sites and their local communities are situated.

Chapter 5 is the first of the results chapters and draws on the focus group discussions to examine how people feel about living near to major hazard sites, what influences their perceptions and understandings of major hazard sites and how they express those views in discussion. The chapter looks in turn at the relevant contexts, forms of evidence and argumentational repertoires that are mobilised in the production of public perceptions of risk. Chapter 6 discusses the results that emerged from the Q-method exercise, identifying the different points of view revealed by factor analysis of the data and providing an interpretation of these points of view in relation to the notion of risk toleration. Chapter 7 returns largely to the focus group data to consider attitudes revealed towards a series of normative policy issues.
These include questions of information rights and communication, risk regulation and land use planning policy.

Finally, Chapter 8 summarises and reflects on the main conclusions of the previous chapters, concentrating on those aspects of the research which have implications for the HSE, as well as for others involved in the management of major accident hazards. Questions of public risk perception are discussed in relation to both general principles of policy and practice, and to recent and forthcoming legislative developments, most notably the Seveso II Directive.
2. RESEARCH INTO PUBLIC PERCEPTIONS OF TECHNOLOGICAL RISK

This chapter briefly situates the approach taken in this study in relation to previous research on public perceptions of risk. We view public perceptions of major accident hazard sites as being inherently bound up with a wider set of social processes and relationships. One corollary of this view is that in order to understand the specific dynamics of public views on the risks associated with these sites, our investigation needs to extend to the wider social and cultural context within which these sites are situated. In this chapter we draw support for this approach by outlining some related issues in the recent research literature and their significance for the study of public perceptions of major hazard sites.

2.1 THE 1992 ROYAL SOCIETY REPORT

The study of risk perception is a rapidly expanding field that now encompasses a considerable body of research. There have been a number of previous reviews of this research, one of the most recent being the influential report on risk by the Royal Society Working Group published in 1992, which included a comprehensive discussion of developments in the risk perception literature. Rather than duplicate that work here, therefore, we take the conclusions of the Royal Society report as a starting point for our discussion.

The Royal Society (1992) report identified four key trends in the risk perception literature. Firstly, that the distinction that had previously been maintained between 'objective' risk and 'subjective' or perceived risk had been challenged to the extent that it was no longer considered to be a 'mainstream' position. Secondly, that, with the extension of early research (notably that associated with the Decision Research group in Oregon, USA), the psychological study of risk perception had matured into an established field founded on cognitive psychology and the study of decision making behaviour. Thirdly, the report observed that risk communication had emerged as a key topic of concern, linking the work in basic risk perception research to questions of policy formulation, legislative frameworks and public participation in decision making about hazards. Finally, in what it identifies as 'perhaps the most significant' development, the report notes that the significance of social, cultural and political processes in shaping individual attitudes towards and the social acceptability of risks had been widely acknowledged. As we have already indicated, this final principle – of what we can refer to for shorthand as the 'social construction' of attitudes towards risk – is central to our study. In the latter sections of this report, we also turn to the implications of our research for risk communication and risk management. In their conclusions the authors of the report also suggest that, as far as it is either desirable or possible, a key research priority for the 1990s is to investigate the possibilities for 'bridging the gap' between the psychological and sociocultural approaches to the study of risk perceptions. As the following chapter makes clear, we make a small step towards integrating the two approaches in this study.

Our discussion of the research literature is organised thematically around four key issues, which in part connect to the themes in the Royal Society report. Firstly, we make some observations on the question of 'subjective' risk perceptions and social context. Secondly, we review recent research on the relationship between trust and perceptions of risk, which is a

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1 See also Clarke and Short (1993), who review the (mostly American) sociological research literature on risk.
major focus of our research, and touch upon related problems of risk communication. In the Royal Society report, the issue of trust in risk management institutions is highlighted not only as setting ‘a major future research agenda for social science research into risk’ but as being an important point of contact between the two schools of research. We then depart from the themes raised in the Royal Society report and discuss the relevance of recent work on locality and culture for risk perception research before concluding the chapter with a discussion of recent studies that focus specifically on public perceptions of major accident hazards.

2.2 SUBJEC TIVITY, ‘COGNITIVE BIAS’ AND PUBLIC RISK PERCEPTIONS

As we have noted, the authors of the Royal Society report found the majority of researchers to have rejected a hard distinction between subjective and objective evaluations of risk. Nevertheless much of the psychological research on risk perceptions has a very strong judgmental orientation, betraying the influence of decision theory. One influential body of psychological research is that investigating ‘cognitive bias’. This is an issue of considerable interest in relation to risk communication and attempts at behavioural modification and it seems appropriate to make a few observations. Concern now tends to focus on bias in processing information about risk and modifying perceptions of risk accordingly. However, there are non-cognitive, expressive aspects to people’s perceptions of risk that elude such an approach (Stallen and Tomas, 1988). To take an example which has some bearing on the present study, Jenkins-Smith and Bassett (1994) found considerable variation in the way in which people update their risk perceptions in the light of new information. Rather than simply ascribing this asymmetry of response to risk information to ‘optimistic bias’ or ‘unrealistic optimism’ (or, conversely, pessimism), with its implication of distorted or wrong judgement, people’s perceptions of risk can also be related to strength of belief in a good or bad outcome (Eiser, 1994). Such beliefs, which have emotional and value dimensions, may be shaped by a variety of social relationships and cultural commitments that together can have a significant influence on cognitive processes.

Thus, an alternative perspective on these differences in public evaluations of risk might consider the social and cultural context in which those exposed to a risk are located. In a rather different use of the notion of ‘cognitive bias’ work based on the ideas of anthropologist Mary Douglas, often referred to as Cultural Theory, has directed attention to the influence of social and institutional contexts on individuals’ worldviews, or orienting dispositions, and consequently on their perceptions of risk. Douglas’s work highlights the importance of particular aspects of risk, such as accountability and blame, but reduces socio-cultural context to only two dimensions to produce four very generalised categories.2 A less abstracted

2 Although we do not draw on Douglas’s Cultural Theory in this project, it seems appropriate to note some recent work using this approach. Much of the work that has been stimulated by Douglas’s contributions has been of a theoretical or interpretative nature. There have, however, been attempts to operationalise Douglas’s conceptual framework. Perhaps the most notable of these has been the survey-based analysis of worldviews developed by Karl Dake (1991, 1992). Recently a number of researchers have begun to test and adapt the items used by Dake in his studies. Some of these studies have given results which seem to support the proposition that worldviews, as defined by Douglas’s theory of cultural bias, act as a cognitive filter in the perception of risk (Jenkins Smith, 1993; Slovic et al., 1994; Peters and Slovic, 1995). On the other hand, the results of other attempts to test out Dake’s measures have been less positive, finding that they only accounted for about 5% of the variance in perceptions of risk (Sjöberg, 1993; 1995a; 1995b). A more considered evaluation of the utility of the approach therefore awaits further data. One theoretical issue that is of concern, however, is that in the research based on Dake’s operationalisation the different worldviews cease to be linked to specified social contexts and becomes a psychological property of the individual. This attenuates the strong claim, which was the basis of Douglas’s original theory, that specific cultural biases are linked to
approach to context might begin with the history, past experience and current social and institutional relationships of those exposed to a hazard. It would also need to take account of the variety of social networks within which individuals are situated. These are significant because, despite the efforts of risk communicators, the information on which people base their judgements of risk is more likely to be encountered in their everyday attempts to keep informed or entertained than to be actively sought out from official sources (Liebow et al, 1993). This can include a range of sources from the mass media to local gossip. However, there may be a reinforcing relationship between awareness of risk and levels of concern. For example, encountering media reports of risks may lead to increased concern, while feelings of concern may in turn sensitize individuals and lead them to notice or seek out such reports (Eiser et al, 1994). We consider this argument further in the concluding section of the chapter.

We have already noted that the authors of the Royal Society report no longer considered a distinction between ‘subjective’ (usually meaning ‘lay’) and objective (usually meaning ‘expert’) perceptions of risk to be a ‘mainstream’ view. The discussion of ‘cognitive bias’ also raises important questions about how we understand public perceptions of risk that do not accord with those of risk assessment experts. The implication of such research that addresses this disparity is very often that the ‘bias’ lies with the lay public, rather than with the experts. However, as studies of the views and practices of scientific experts have shown, experts themselves may be just as subject to differences of perception and judgement (which are not usually referred to in the same terms as ‘bias’) depending on their institutional and disciplinary locations. Exponents of Cultural Theory employ more abstract categories related to social and institutional location (‘hierarchist’, ‘egalitarian’, etc.) to make much the same argument. In other words, knowledge – ‘expert’ knowledge no less than ‘lay’ knowledge - is always ‘situated knowledge’ (Haraway, 1991). This ‘situated’ view of perceptions and understandings of risk can also help us out of the constraining terminology of ‘cognitive bias’. What it tells us is that to understand people’s views of and responses to risk we need to understand something of the contexts within which they are formed. Furthermore, what is considered particularly salient or relevant in one context may not appear so in another. To put that another way, the criteria considered relevant by members of the ‘lay’ public when forming their impressions of or making judgements about a major hazard site may not be the same as those that inform expert evaluations of the site. In that light the ‘problem’ in a given instance may not be one of ‘cognitive bias’, in the sense of a distortion of judgement as evaluated according to a given set of criteria (and the question is always, whose criteria?). Instead it may be a problem of people operating with quite different (and perhaps incommensurable) frames of reference.4

Although much of the research on risk perceptions has been of a cognitive nature there has been a growing recognition of the importance of social context. For example, one criticism that can be made of the earlier psychometric studies is that people were asked to evaluate risks devoid of any context. However, in an interesting re-analysis of one of the classic psychometric data sets collected by Slovic, Lichtenstein and Fischoff, Gregory and Mendelsohn (1993) conclude that very often risk ratings may be ‘net’ of evaluations of benefits and trade-offs, rather than simply being ratings of the hazards themselves. This re-interpretation of the data

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3 For example, studies such as Kraus et al (1992) and Slovic et al (1994) have highlighted the extent to which ‘objective’ scientific assessments of risk are influenced by the institutional location of the scientists in question. Others researchers have highlighted the ways in which different styles of scientific practice lead to fundamentally different – and often incompatible – scientific perspectives on a particular risk problem (Fujimura and Chou, 1994).

4 For a discussion of the problem of frame conflict in perceptions of risk, see Vaughan and Seifert (1992) and Gray (1995). Irwin, Simmons and Walker (1999), in a paper that draws upon this research, discuss this problem in terms of lay or ‘local’ knowledge.
points to the social and cultural context within which such evaluations take place. Indeed, much of the recent work by leading exponents of the psychometric tradition has focused on the importance of social, political and cultural factors in shaping public risk perceptions (see, for example: Burns et al, 1993; Flynn et al, 1992, 1994; Slovic, 1993). Hence issues of fairness and equity, or of being able to attribute responsibility and blame, are often central to evaluations of and responses to a specific source of risk (Rayner and Cantor, 1987; Douglas, 1993). The importance of contextual considerations for public perceptions of and responses to risk is also evident in the findings of other psychological research. For example, the perceived consequences of an event appear to figure significantly in evaluations of technological hazards (Sjöberg and Drottz-Sjöberg, 1993b, 1994; Tyszka and Goszcynska, 1993). Perceived consequences have, in fact, been found to be more important than the level of perceived risk of an event taking place in explaining demands for risk mitigation (Sjöberg, 1994). This is a point to which we shall have occasion to return in chapter 5, when discussing the results of our own research. It not surprising, therefore, that strategies for perception modification based on a cognitive model, such as comparing the probabilities associated with unfamiliar risks with those for known risks, have been found to be unsuccessful (Freudenburg and Rursch, 1994). Thus the argument that perceptions of risk are shaped significantly by contextual processes - rather than simply by risk probabilities or even risk characteristics - now commands widespread support. We might therefore expect public perceptions of major accident hazard sites to reflect concerns about economic, social, health and environmental consequences, as well as concerns about the management of the accident risk itself (Eyles et al, 1993) and socially-embedded processes of trust (Sundqvist, 1995; and see section 2.3 below).

A perspective on attitudes that has influenced our thinking on risk perceptions is that developed under the label of rhetorical social psychology (see, for example, Billig, 1987; Shotton, 1993). Essentially, this theory treats expressed attitudes as arguments, rather than as mental properties or objects. It is based on an argumentational model of thought processes and sees those processes as inherently social and dialogical – that is, they take place in interaction with others and with their views and arguments. This perspective takes the formation and expression of attitudes out of the head of the individual and situates it in a social and discursive context. From this perspective we are not dealing with ‘cognitive bias’ but with argument and counter argument, marshalled from pre-existing discursive resources. Although rhetorical analysis is not central to our study, this argumentational model has nevertheless informed the research design and our interpretation of the data.

Acknowledgement that the formation or modification of risk perceptions is not a purely cognitive process also leads us to consider the influence of values and emotions (Biel and Dahlstrand, 1995; Rohrmann, 1994). For example, it has been suggested that there is a relationship between moral values and tolerance of risk or risk taking (Sjöberg and Drottz-Sjöberg, 1993a; Drottz-Sjöberg and Torell, 1993). Similarly, in a study of perceptions of risk associated with a nuclear waste repository, both attitudes to the source of risk and fear of its consequences were found to have considerable influence on perceptions of risk (Sjöberg and Drottz-Sjöberg, 1993b; 1994).

Acknowledging the importance of emotions, particularly strong negative emotions, in shaping risk perceptions appears to resurrect the spectre of the "irrational, emotional public". However, one should be cautious of the pathological psychiatric meanings associated with terms such as fear and anxiety (Drottz-Sjöberg and Persson, 1993). Institutional views of public concern about technological risk are often dismissive of what are seen as the public's unfounded and unreasonable 'anxieties'. Such evaluations implicitly frame public anxieties as a sort of social pathology. In psychiatric terms 'anxiety' is a clinical category to which an individual's experience may be assigned and accordingly pathologised. When transferred to everyday
speech, however, medical metaphors are not merely figures of speech but may be used to legitimate value judgements and the exercise of power. Underlying this framing is an appeal to the authority of science (often made by invoking the standard of ‘scientific objectivity’) to warrant the dismissal of the views expressed by members of the public. For that very reason we need to be conscious of the extent to which, even in their clinical application, let alone when used in other social contexts, categories such as ‘anxiety’ are socially constructed – that is to say, they are not naturally occurring categories (see Hallam, 1994). Far from being irrational, in fact, affective reactions to hazards appear to serve as ‘orienting mechanisms, helping people navigate in a complex, uncertain world’ (Peters and Slovic, 1995, p.14). Rather than seeing people’s anxiety and fear simply in individual terms, however, we can also set them in a broader context and consider the extent to which they are linked to wider socio-cultural processes and configurations (see, for example, Massumi, 1995; Dunant and Porter, 1996). Although the scope of this study does not extend to a detailed consideration of these broader processes of risk construction that occur at a societal level, a key theme in recent social theoretical debates has been the issue of trust.5

2.3 SOCIAL TRUST AND INSTITUTIONAL CREDIBILITY

The question of public trust (and distrust) in risk management institutions is central to understanding public perceptions of risk and it constitutes a primary focus of our inquiry. We have already noted above the suggestion in the Royal Society report that the question of trust presents a major new research agenda for work on public risk perceptions, one on which both the psychometric and socio-cultural paradigms can converge. This view was echoed in an American review article published around the same time (Clarke and Short, 1993). The article argued that theoretical work on issues of trust, fairness and the associated problem of institutional failure or ‘recreancy’ (Freudenburg, 1993) can reorient work on risk perceptions by shifting attention to the institutional context within which individuals form their views (Clarke and Short, 1993). Once we recognise the importance of trust, understanding the ‘dynamics of the system’ that systematically erode trust becomes crucial to the enterprise of risk management (Freudenburg and Pastor, 1992b; Slovic, 1993). By viewing individuals in a social and institutional context our analytical attention is drawn to ‘the bases of association from which people derive meaning and a sense of community’ (Clarke and Short, 1993, p. 385, emphasis added).

There has been considerable theoretical debate about the nature of trust, about the conditions necessary for it to exist and of its role in social organisation.6 We will not rehearse these debates here but it is important to recognise that the problem of public distrust in social, economic and political institutions extends far beyond the problem of the management of hazardous industrial activities. For the purposes of this report, as a minimal working definition, trust can be seen as involving a willing acceptance of vulnerability but based on the expectation that certain criteria will be met (Kasperson et al, 1992; Mayer et al, 1995). One recent discussion of the dimensions of social trust suggests that they include at least four expectations. Firstly, there are expectations about the commitment of an organisation to meeting its obligations. Secondly, there are expectations about its competence over time to meet those obligations. Thirdly, there are expectations about the extent to which an organisation cares about those with whom there is a relation of trust. Fourthly, there are expectations about the extent to which its obligations might predictably be expected to be met (Kasperson et al, 1992).

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5 Two influential contributions to the current theoretical debate on the societal significance of risk can be found in Beck (1992) and Giddens (1990).
6 Many leading social and political theorists have contributed to this wider debate. For a recent review, and a significant contribution to the debate, see Misztal (1996).
Thus, perceptions that an event was the result of managerial incompetence, and may therefore signal the risk of future failures, has been identified as a determinant of distrust and of a critical public response (Burns et al., 1993; Freudenburg, 1993). Distrust in institutions responsible for managing risks has been linked to heightened perceptions of risk. Conversely, high levels of trust in those responsible for managing a hazard have been associated with lower levels of perceived risk and an increased perception of safety (for example, Fitchen et al., 1987; Kivimaki et al., 1995).

In an article that challenged the assumptions underlying notions of 'acceptable risk', Rayner and Cantor (1987) argued that their research found most people to be concerned about three things. First, people were concerned about the process by which those responsible went about securing public consent to a risk. Second, they were concerned about the principles for apportioning liability in the case of anything going wrong. Third, they were concerned about the trustworthiness of the institutions and organisations responsible for managing the risk. Rayner and Cantor's work draws on Douglas's cultural theory, in which the issue of responsibility and accountability is identified as a central theme (see Douglas, 1992). Other research appears to support their claim that being able clearly to attribute responsibility is an important element in coping with threats (Hallman and Wandersman, 1992). The proposition that people's perceptions of or opposition to a technological risk are shaped more by social relations and concerns about the perceived trustworthiness of those who manage it than by 'objective' assessments of the risk has now received widespread support. As the Royal Society report anticipated, this appears to be a theme upon which both psychological and socio-cultural approaches have converged (Bord and O'Connor, 1992; Flynn et al., 1992; Kasperson et al., 1992; Kowalewski and Porter, 1993; Liebow et al., 1993; Ostry et al., 1995; Renn et al., 1992; Sjöberg and Drott-Sjöberg, 1993; Wynne et al., 1993). Similarly, even some researchers working with a decision theoretic approach acknowledge that, whilst decision theory is a useful analytical device, an understanding of the foundations of trust requires that other aspects of personal biography, social, cultural and structural context be taken into account (Preisendorfer, 1995). In view of the emphasis now being given to the importance of trust for understanding public risk perceptions, the usual question of how much risk the public will tolerate can even be reframed as 'how much distrust will the public tolerate?' (Flynn et al., 1992, p. 427).

One significant conclusion to emerge so far, however, is that there do not appear to be grounds for assuming that problems of trust and credibility can be overcome simply by improved risk communication (Flynn et al., 1993a; Mitchell, 1992; Simmons and Wynne, 1994; Slovic et al., 1991). In fact, 'communication' as the transmission of information may not be the problem at all (Johnson and Slovic, 1994). Stallen and Tomas conclude that 'genuine communication with the public [...] would require us to pay at least as much, and perhaps more attention to issues of personal control as to explaining the intricacies of hazard assessment, PRA, exposure analysis or acceptable risk standards like 10⁻⁸, however valuable these concepts are for the judgmental purpose of, e.g., balanced regulatory decision making' (1988, p. 245). The power of individuals to influence conditions that affect them (which we refer to as agency) – or conversely of powerlessness and dependency - is a closely tied up with perceptions of risk (Wynne, Grove-White and Waterton, 1993; Irwin, 1995). However, it is not simply an issue of personal control. This still tends to maintain the focus on the individual.

Risk is far more bound up with social structural factors and the activities of large organisations than the majority of the work on risk perceptions would suggest (Freudenburg and Pastor, 1992a; Clarke and Short, 1993; Porto and Defreitas, 1996). It is perhaps not surprising, therefore, that the public's perceptions of risk should be related to their relationships with and experience of institutional and organisational structures. Ethnic and gender differences in risk perception have been attributed to socio-political factors such as power, status and alienation
(Flynn et al., 1994). When some of those most vulnerable to risk may be from socially marginalised socio-economic or ethnic groups, for whom distrust in the risk management system may be bound up with experience of other forms of inequality or alienation, the task facing those in positions of responsibility is far more complex than that of simply communicating more clearly (Vaughan, 1995). Conflicts over risk tend to highlight the different framings of the issue by different actors (Flynn et al., 1993b; Freudenburg and Pastor, 1992a and 1992b; Gray 1995; Vaughan and Seifert, 1992), framings which in turn are rooted in differences in belief and value systems (Drottz-Sjöberg and Persson, 1993). In other words, at the root of the conflict can be found a struggle over conceptual frameworks, and their associated allocations of responsibility and control, which leaves open the question of who should accept whose rationality (Lidskog, 1993). The question of how to integrate these differences into the risk communication process (Cvetkovich and Earle, 1992) is far from clear (Slovic et al., 1991). It seems clear, however, that the issue is not simply one of individual control but one of collective agency. In general, however, what we know about the conditions that foster distrust suggests that moves to go beyond traditional approaches to risk communication and increase public participation in the process are likely to increase the legitimacy of risk management procedures and at least create the possibility of a reduction in public distrust (Renn et al., 1995; Simmons and Wynne, 1994; Slovic, 1993).

2.4 LOCALITY, CULTURE AND RISK PERCEPTION

We have repeatedly emphasised the importance of context but there is one aspect of context that has only occasionally received the attention of risk perception researchers, and that is the locality itself. Cultural and social approaches to risk emphasise that risks and risk attitudes are socially constructed and cannot be separated from the lives of those who express them. Where risks are experienced and where people live their lives will therefore be important in shaping and framing risk attitudes. Various risk perception and risk communication studies concerned with locality-based risks have begun to recognise the importance of the place within which hazards are situated and perceptions are formed. As another group of researchers has argued, risk perception is a complex and dynamic process that is influenced by the local context in which the risk is embedded and by the manner in which the risk is addressed (Fitchen et al., 1987). However, there is considerable potential for the further exploration of locality as a factor in risk perceptions; for example, by drawing on recent developments in cultural geography.

There is a number of ways in which place may be of significance in the formation of attitudes towards sources of technological risk. Some of these become clearer if we adopt a more analytical understanding of the notion of 'place'. Agnew (1993) has argued that a thorough conception of place entails an interweaving of three elements:

- **locale**, a term proposed by Giddens (1983) to signify the physical settings in which social relations are constituted;
- **location**, which encapsulates the effects upon locales of wider social and economic relationships and processes; and
- **sense of place**, the local structure of feeling through which people internally construct

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8 For example, Cosgrove and Jackson 1987; Eyles and Smith, 1988; Jackson 1989.
definitions of their locality and, potentially, of their community (Rose 1995).

A key tenet following from this definition is that 'the local social worlds of place (locale) cannot be understood apart from the objective macro-order of location and the subjective territorial identity of sense of place' (Agnew 1993, p. 263). We postulate that each of these three elements of place plays a role in the formation of attitudes towards locally-sited technological risk.

Viewed from a cultural perspective, locales provide the setting within which risk attitudes are socially constructed. To understand the formation of attitudes it is necessary to interpret the geo-historical position of the people who express them and to situate them within the settings of everyday life (Shottter 1993, Sayer 1989). Linking geography to cultural perspectives on risk thus produces an emphasis on spatial contextuality. Although the results of many survey studies of public risk perceptions are based on aggregate data, people do not experience life as a mass. Instead, 'their knowledge is acquired, and they live their lives, in the context of social worlds dominated by the perspectives of different reference groups, in which meaning is attributed to acts and events through communication and interaction with limited numbers of people' (Agnew 1993). A similar view has been used to support claims that responses to environmental risks are inextricably bound up with social ties and with shared experience of and commitment to the neighbourhood (Klintman, 1995).

Place as location, directs attention towards the setting of local risks and local risk attitudes within far broader, economic, social and risk frameworks. Influences on 'risk cultures' will be in part those that are felt nationally and internationally, and in part those that are more specific to the locality and the risks it incorporates. Broad economic and social changes taking place within society and providing the wider context for risk producing industries and risk-taking communities may also be important, in relation to both the distribution of risks and the construction of risk attitudes. The restructuring of spatial relationships within global processes of capital accumulation, increased mobility of capital and increased competition between places for this highly mobile capital (Harvey 1993) will all be significant for institutional and public attitudes taken towards risk producing installations already in place and towards potential new ones. In a comparative framework, even though many public concerns about risk can be shown to be common across different national contexts, these economic, social and political factors appear to have a significant influence on the relative importance given to specific concerns in different locations (Vari et al, 1991).

The 'sense of place' or the 'felt sense of the quality of life at a particular place and time' (Pred 1983) may embrace activities which generate risks (particularly where these are physically or economically substantial). These activities may either detract from or enhance the sense of place that is formed. Studies on local attitudes to Sellafield have revealed that for some, Sellafield is an important component of local identity, whilst for others it is a key detractor from a sense of place which asserts the essential rurality of Cumbria. This tainting of the 'sense of place' as a consequence of public perceptions of the presence of hazardous technologies in a community has been characterised as 'stigma'. Goffman (1964) wrote of individual stigma in terms of 'spoiled identities'. Although most commonly invoked in connection with economic 'blight', this sense of spoiled identity also has social and psychological effects (Edelstein, 1988; Kraus et al, 1992; Slovic et al, 1991 & 1994; Gregory et al, 1995).

In another sense, perceived threats can also form a basis for new forms of identification and community identities (Edelstein, 1988; Stoffle et al, 1991). Thus, in at least one study, local disquiet and opposition to a site has been found to be associated with distrust of the institutions responsible, a sense of social alienation and related perceptions of risk but not to correlate strongly with conventional socio-demographic divisions (Kowalewski and Porter, 1993). A
prime example of this in recent years in Britain has been the opposition to various road building schemes, which has brought together the most unlikely alliances from across the spectrum of social groups, from county Conservatives to new age travellers. On the other hand, Lima (1995) found that strength of identification with place had a strong relationship to cognitive and emotional responses to earthquake risk.

This harmony or dissonance with individuals' and groups' 'sense of place' may thus play an important role in the framing of risk attitudes. Recent work within cultural geography on the creation and selling of images and 'atmospheres of place' (as industrial locations, tourist destinations, etc., see Watson 1991) may also provide connections with the currently limited analysis of frameworks of information and communication, text and image, within which risk attitudes are formed (Krimsky and Plough 1988).

Cultural studies of particular localities also draw attention to the ways in which people may use their own 'languages' to speak about risks that are in some sense 'unspeakable'. Waterton (1995) records the use of irony and humour by residents living in the vicinity of the Sellafield reprocessing plant to manage their anxieties. In a rather more extreme example, Konstantinov (1995) reports that in Bulgaria, where open criticism of government policy invites harsh sanctions, peasants living near the Kozlodui nuclear power station counter the official state discourse of nuclear power by adopting their own vernacular code and talking about environmental anomalies associated with the plant in terms of a local myth, the Dragon of Kovachitsa. Such examples may seem exotic but, as with all cultural comparisons, they direct our attention to the importance of local meanings and patterns of discourse for understanding a community's experience of risk and alert us to apparent silences.9

Cultural research has also shown that the distribution of perceived risk in local populations does not necessarily coincide with a priori geographical definitions based on local political and administrative boundaries or on 'objective' assessments of the area at risk from a hazard (for example, consultation distances). Rather than being determined simply by the nature of the hazard presented by a particular project or installation, it is suggested risk perceptions will be shaped by the social, cultural and psychological residuals of previous experience of this and other hazards which leave a 'risk perception shadow' (Stoffle et al, 1991). Thus elements of other, perhaps unrelated, risks may be used by local people as analogues for understanding and responding to a particular risk.

This brief review highlights the importance of a consideration of place to research that is focused explicitly on public perceptions of the risks associated with major hazard sites. As we shall see, there is already some recognition of these issues in existing research on the subject.

2.5 RISK PERCEPTIONS AND MAJOR ACCIDENT HAZARDS

Although major hazards have been recognised as a particular category of technological risk for over 20 years, there have been comparatively few studies of how local publics perceive these risks. Where work has been focused on particular forms of site-based risk, nuclear power and radioactive waste have figured most prominently (Van der Pligt 1992, Macgill 1987, Wynne et al 1993). In recent years hazardous waste landfill and incineration have also received significant attention from researchers in the US, often with a focus on new siting controversies or 'contaminated communities' (Edelstein, 1988). One limitation of this latter body of work, in

9 For another example of cultural silencing, see Bailey et al's (1992) observations on the way in which the local 'atmosphere' can discourage vocal opposition, even where there is considerable public concern.
relation to the present research project, is that it only deals with populations concerned about persistent and often undetectable toxic risks. Such risks have a particular cultural resonance because of their associations with notions of 'contamination' that arouses particular public anxieties (Erikson, 1990; Beck, 1992). Although some types of major hazard site may be perceived as presenting a similar risk to local populations, in the case of many other sites the risk of this sort of long-term toxic exposure (and its powerful cultural associations) is absent.

In the UK there has been a relatively small number of studies concerned directly with major hazard sites. Social and Community Planning Research (Prescott-Clarke 1980, 1982) undertook a study of public perceptions of a range of risks incorporating analysis of perceptions of major hazards, through a small-scale, qualitative feasibility study on Teesside and a larger nationally representative quantitative survey. The national survey (Prescott-Clarke 1982) revealed a high level of perceived risk. For example, two-thirds of the general public believed that chemical and other major industrial works presented a danger to the public (and about half of those people produced estimates of the maximum possible fatalities from a major incident that ranged from 1,000 to 300,000). The research also found that the proportion believing such sites to be a threat was slightly lower among people living within one mile of a major industrial facility when compared with those living further away. However, since the designation of 'living close to a major industrial facility' was self-defined by respondents it was not possible to identify those who actually lived in close proximity to major hazard sites. The discussion of the results of the focus group work, which was conducted on Teesside, was in some ways more revealing and included selected quotes that pointed to important underlying issues of trust in regulators, economic dependency and industry-community relations (Prescott-Clarke 1980).

Smith and Irwin (1984) undertook a survey of public perceptions of risk in the vicinity of major hazard industry in Runcorn and Widnes, in Cheshire, concluding that in neither of the two survey areas 'did the risks associated with factory accidents emerge as a major concern'. However, they questioned the value of attitudinal survey evidence, stressing the dangers of overgeneralization and the need to recognise the diversity and contextual nature of risk attitudes. A number of studies have also considered public perceptions and responses in the context of information given out to the public under the CIMAH Regulations that govern 'top-tier' major hazard sites. These studies include research carried out as part of comparative European studies on the implementation of the public information requirements of the European Seveso Directive (Wynne 1987, 1990) and work carried out around the Carrington complex in Manchester (Jupp and Irwin, 1989). Irwin (1995) discusses the results of questionnaire and semi-structured interview work around plants in Eccles and Clayton/Beswick which found a generally high level of concern about factory accidents and pollution sitting alongside other concerns such as unemployment, crime and violence. The trust placed in various possible disseminators of information about hazards was also explored, revealing a low level of trust in industry but also an overall pattern of scepticism and wariness about information sources. Irwin stresses that both the hazards and their perception are very much embedded in the nature of the locality and the lives of local people, so that they are 'an intrinsic part of everyday social reality and the very identity of these areas' (Irwin, 1995).

Looking beyond the UK, a number of studies in the Netherlands have examined public perceptions of major accident hazards. Vlek and Stallen (1981) and Stallen and Tomas (1988) report on the results of research undertaken around the port of Rotterdam, using a number of different approaches to studying public risk perceptions. The 1981 study involved 700 people responding to a psychometric questionnaire that asked about their personal judgements of various risky activities. Vlek and Stallen identified three cognitive dimensions underlying individual judgements - riskiness, beneficiality and acceptability. However, despite its scale,
Vlek and Stallen emphasise the limitations of their study. These include the problem of group average ratings hiding substantial differences in understanding and interpretation, and Vlek and Stallen raise doubts over the meaning of comparisons made between major hazards and other very different types of risk. The later study in 1988, involving 600 interviewees, sought to extend this work by focusing on 'feelings of insecurity' when faced with the threat of a major accident, and the importance of 'personal control' in the response made to insecurity. Four types of response to the threat of major hazards were identified - secure, accepting, vigilant and defensive. In contrast to studies of levels of risk perceived risk, they did not find that the distribution of this repertoire of responses varied according to spatial proximity to major hazard sites. The research did however find women to be more anxious about the risks because they valued personal health and well being more highly than men. In particular, Stallen and Tomas argued that it is important to look at the context of statements made about risk because the intensity of feeling about a threat is only one aspect of a more involved qualitative structure of feeling.

The apparently greater level of acceptance of the risk among people living in the vicinity of a major hazard site reported in Vlek and Stallen's (1981) study has also been observed in some of the UK studies already mentioned (Prescott-Clarke, 1982 and Smith and Irwin, 1984). So what should we make of the finding that residents living around some major hazard sites appear to perceive a lower level of risk than those living away from them? Wiegmann, Guteling and Boer (1991) set out explicitly to examine this phenomenon, which was replicated in their study. Their study was undertaken in the vicinity of the DSM chemical complex in southern Holland and, as a control, at another non-major hazard location further away. Although economic dependence upon the industry was found to play a part in this phenomenon, it only appeared to account for a small proportion of the variation. They attributed the generally lower levels of concern to a process of social learning. They argue that, through a process of 'experiential verification' based on living every day near to the site, the residents near the chemical complex 'learn' that the complex is not a danger and are consequently less affected by the 'biased' accounts of industry risks offered in the media. Here we are back with the issue of 'cognitive bias' and how it is countered or 'corrected'.

Although experiential learning may well have a part to play in the formation of apparently lower levels of risk perception among communities living close to major hazard sites, it is not self-evident that this is the only explanation. Let us consider an alternative interpretation that might reasonably be made of this 'fact'. Wiegmann, Guteling and Boer observed that residents living near to a major chemical complex tended not to read or to dismiss media reports of technological hazards. Rather than interpreting this as a result of 'social learning', the avoidance of bad news and the denial of danger may be a psychological and cultural defence for coping with risks over which individuals perceive themselves to have little or no control (Frewe et al, 1994; Lima, 1995; Rohrmann, 1994; Wynne et al, 1993). We might also consider a corollary of Eisner et al's (1994) argument, which was noted earlier, about the reinforcing relationship between risk and risk perception. It may be that, in some cases at least, avoidance of disquieting media reports has the self-reinforcing effect of contributing to lower levels of concern. In other words, an expressed lack of concern may in fact conceal an underlying concern that is discomforting enough for individuals to have to deny or suppress its existence. The point of this discussion is not to suggest that this alternative account is the only possible explanation for an apparent lack of public concern about living close to a major hazard site. Rather we wish to highlight the complexities of a phenomenon such as an expressed lack of concern, which regulators and site operators might otherwise be inclined to take at face value.  

10 That is not to say that those responsible for the management of major accident hazards welcome a complacent public. Indeed, repeated efforts are made by emergency planners to stimulate the local
2.6 CONCLUDING REMARKS

There are pronounced differences between the political culture of the UK and those of the USA (where the majority of risk perception studies have been carried out) and other countries, such as the Netherlands. It is therefore a question for empirical enquiry whether the conclusions drawn from research conducted in other countries can readily be transferred to the British situation. Similarly, as we noted earlier, it cannot be assumed that research relating to one type of site will necessarily be relevant to understanding another. Nevertheless, as the Royal Society report noted, the issue of public trust in those responsible for managing the risks from hazardous technologies is one that recurs in many studies from many different contexts.

Another recurrent theme is that of the credibility of both the risk management arrangements and the sources of information about risk. To this we would add the issue of the public’s ability to influence the circumstances relating to risk exposure, which we have referred to as agency but which might also be discussed in terms of power. This is an issue that has been identified in several of the studies outlined above but which tends to receive less emphasis in much of the literature.

We approached this study, therefore, with an awareness of the existing literature but with an open mind about the extent to which any specific study could inform our own research. However, whether we are considering issues of ‘cognitive bias’ or those of trust and credibility, what should be clear from the preceding discussion is that public perceptions of the risks associated with major hazard sites need to be explored with some sensitivity to the specific contexts within which different sites are located and public views are formed. We sought to make a contextual perspective central to the research design and analytical perspective developed for this study, which we describe in the next chapter.
3. RESEARCH DESIGN

Before we proceed to the research design, a few words about the word 'context', which has already appeared repeatedly in this report, are in order. The word may seem abstract and vague so it may be helpful if we set it, perhaps rather tautologically, 'in context' and be more explicit about what we mean by it.

In this report we use the word 'context', or sometimes 'socio-cultural context', in two main ways. Firstly, and most frequently, we use it to refer to the way in which major hazard sites are always situated in relation to a whole variety of dimensions of social existence. These include both temporal and spatial contexts - the history and geography of a site and the ways in which they interact with the history and geography of a particular place. This may include both a site’s history as an employer or benefactor to the area, and also its accident history and the history of its unwanted impacts on the area. Context here also refers to the pattern of institutional relationships in which a major hazard site may be located - for example, with regulators, local authorities, industry associations, other companies, or community organisations. This may include prosecutions for misdemeanours, planning controversies, involvement in activities such as the chemical industry’s Responsible Care programme or support for local organisations and activities. There is also the context of a site operator’s relationships with the local community itself. These may be mediated through one of the channels already mentioned but there will often be direct relationships with local people, whether as an employer, a source of nuisance, a benefactor or a partner. Hence this local context includes the pattern of local social networks and the personal relationships that link individuals ad organisations.

Moving out from this local context we sometimes make reference to the wider political-cultural context. By this we are referring to broader social and political patterns and trends. These include trends such as the pervasive awareness of risk (not just that relating to major accident hazards) that has come to characterise our society, the general distrust in and disenchantment with government, the repeated challenges to the authority of science, or the presence of risk-related images and discourses in popular culture. They also include the dynamics of public risk issues, whether BSE or nuclear waste, which send signals to individuals and local communities about organisational and institutional motivations and competence.\(^1\)

The contextual approach to the study of public risk perceptions outlined in the previous chapter had clear consequences for the research design of the study. In order to gain a better understanding of public perceptions in relation to the local contexts within which the major hazard sites were located, we employed a comparative case study design that used primarily qualitative research methods. The research design was developed with the aid of a small pilot study carried out in December 1995 and January 1996 around the Courtaulds Chemicals site at Spondon near Derby. This chapter gives a brief outline of the various components of the research design.

3.1 SITE SELECTION PROCESS

Our initial guide in selecting sites for study was the HSE’s requirement that seven sites should be chosen to represent a variety of different types of hazard, as well as including sites subject

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\(^1\) There is a third aspect of context that we touch on very occasionally when discussing the results of our research and that is the context of the research process itself, and specifically of the focus groups.
to both the CIMAH and NIHHS regulatory regimes. When selecting the sites we also
endeavoured to ensure that they included a range of the following characteristics: physical scale
of installation; socio-economic composition of surrounding population; newness of hazard
source; accident history; and level of local debate, for example on planning matters. A
preliminary listing of potential sites was obtained by selecting from the MHAU database of UK
major hazard sites and categorising those picked out by type of hazard and installation.

For practical reasons we were constrained by the need to choose areas with a sufficiently large
population living close to the site to make recruitment to the focus groups viable. We used the
consultation distance around the site as a rough demarcation line in making this judgement. We
excluded sites where the surrounding area was described on the database as entirely rural or
industrial, or where the consultation distance was very small. This increased the probability
that a reasonable number of people would be living near to the selected sites. Using small area
census data accessed via SASPAC, a radial search around the grid reference for each site was
then undertaken, providing an estimate of the population living within the approximate
consultation distance. If the population was too low to enable the perception research to take
place (500 people was seen as a reasonable threshold) the site was then excluded. We
subsequently derived a more detailed population figure by taking account of the exact
relationship between area included within the CD and the census enumeration districts.

Additional information on the installations remaining was then gathered - such as any known
accident history, recent planning controversy or particular community relation initiatives. This
drew on the research team's knowledge from previous work, supplemented by the experience of
people within the HSE. The socio-economic characteristics of the population surrounding
prospective sites were also examined using 1991 census data to obtain information on
unemployment levels, social class, house type and tenure patterns, ethnicity, migration, car
ownership and age profile. The data for each area was examined for variability across the
various enumeration districts falling within the consultation zone, to produce a summary
profile of the socio-economic characteristics of the population at risk in each case.

The final list of sites for inclusion in the study was therefore drawn up utilising information on
both the hazardous installations and the surrounding communities, and with a view to
maintaining a degree of geographical spread. The sites selected included three chemical
production sites, a major petrochemical complex, an oxygen enrichment and bottling plant, an
LPG storage site and a water treatment works. Details of the case study sites selected and their
localities are given in chapter 4.

3.2 CONTEXTUAL RESEARCH

The contextual research was an important element in the research design. It involved, first of
all, a search of information sources held in local studies libraries and archives. These include
local press reports, local histories, industrial and company histories, local development plans
and ordnance survey maps of the area. This documentary research was supplemented by
interviews with key local actors, such as:

- company management at the major hazard site;
- the HSE Inspector responsible for the site;
- emergency planners;
- land use planners;
- the Environment Agency inspector;
- the chair of the site community liaison committee;
• other figures from the local community, such as head teachers of schools near to the site or local councillors.

This contextual research was an important resource for the project team. It enabled us to gain a good sense of the relationship between each site and its local area in a very brief time, and to identify any issues relating to the site that may have come to the attention of local publics and informed their view of the site. This contextual information was valuable for the subsequent interpretation of the data gathered from the focus groups and the Q-sort exercises.

3.3 FOCUS GROUPS

The main method that we employed for finding out about how people perceive, understand and feel about the risks associated with major hazard sites was through focus group discussions. The advantage of focus groups as a method for this kind of research is that they provide a context in which people interact with one another (Kitzinger, 1994). This creates an opportunity to observe the way in which people's views are formulated, expressed and challenged. It establishes a far more dynamic and in certain ways more revealing research situation than a one-to-one interview or a survey.

The approach that we took at each case study site involved recruiting six-eight groups with about eight local people in each. Recruitment was carried out by professional fieldwork recruiters who were familiar with the local area. Recruiters were given detailed instructions on how to conduct the recruitment and specifying the characteristics of people to be recruited. Focus groups work with small numbers. The principle of assembling a representative sample of participants does not therefore apply as it would in a survey. The main principle in recruiting to the groups was to secure participation by people from a variety of social situations and thereby to ensure that a range of views are represented in the discussions. Participants were told that the discussion was concerned with aspects of living in the area but not that it concerned risk issues or the local major hazard site. This was to avoid self-selection of participants that might result, for example, in some people attending because they had particular concerns about the site or others not attending because they did not feel qualified to speak on the subject. Group participants were given an incentive payment of £35 for participating in the research. The use of incentives was designed to attract people who would not otherwise be inclined to attend such meetings and thereby to increase the range of people participating in the research. The recruitment interview screened for employees of the company or others connected with the industry. Recruiters were instructed to make a note of anyone with direct links to the industry that was willing and able to participate and, if there was a sufficient number, to recruit them to a separate focus group. This was to enable us to explore the views of employees who lived in the area close to the site in question. In practice this only proved to be viable in one area, where the case study site was the major local employer.

Each group met twice with each meeting lasting ninety minutes. There was an interval of two or three weeks between meetings. Meetings were held in an informal local venue, such as a community centre, a private room in a pub or a local hotel.

In the first meeting a discussion guide was used and participants were led through a list of topics, beginning with their views about the area and gradually focusing in on the major hazard site. At the end of the meeting the Q-sort exercise was demonstrated to participants. They were

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2 For a general account of the focus group method, see Morgan (1988, 1993). For examples of the use of focus groups in research on public perceptions of risk, see Golding, Krimsy and Plough (1992) and Wynne, Grove-White and Waterton (1993).
given the Q-sort materials to complete at home. The completed Q-sort was posted back to the research team before the next meeting.

The second meeting began with a discussion of three stimulus sheets containing quotations which expressed different points of view about (a) the provision of public information about industrial hazards, (b) the regulation of industry and (c) who should be responsible for setting safety standards. In the second half of the meeting we employed visual materials which used planning and siting scenarios to stimulate discussion of a variety of risk and policy issues.³

The transcribed tapes from each focus group session produced a considerable body of textual data. In view of the volume of data involved we used a qualitative data analysis programme, NUDIST, to facilitate data management and analysis.⁴ The data analysis employed a process of analytical induction and critical interpretation.⁵ This involved an analysis of themes and issues, and a process of interpretation in the light of previous research and theory, and then, in an iterative process, a frequent return to the transcripts to re-examine these interpretations and conjectures. The contextual information and local interview data collected also informed our analysis of the transcripts. Multiple coders were used to check interpretations of the data.

We noted in chapter 2 that our approach draws on recent work in social psychology that treats expressed attitudes as arguments, rather than as psychological objects. When analysing the focus group data this brought us to look more closely at the moves that people made as they tried out (or tried on) different arguments in the context of the group. Positions frequently shifted according to the modifiers and counter-arguments that other group members introduced into the discussion. That is not to say that views in a focus group necessarily tend to converge, although that may occur, but rather that, as in other situations, people's views are formed and transformed in interaction with others. The arguments that they deploy may usefully be seen as resources - argumentational repertoires - upon which they draw in different contexts as they formulate their views. This enabled us to examine the relative stability and robustness of people's views of risk, as well as to explore the process by which they were negotiated in a given social context.

3.4 Q-METHOD

When developing our research design we were encouraged by the Tender Board to include a psychological component in the research. In response to this we gave some initial consideration to combining a conventional psychometric instrument with the focus group discussions. As we explored this idea we came to the conclusion that there were fundamental differences in the underlying assumptions of the two approaches. This meant that, while it would be possible to use both methods in a single study, we were unlikely to be able to integrate the resulting sets of data in a coherent way. This view was strengthened following discussions with other researchers at a workshop on combining methods in risk perceptions research held early in the project.⁶ Instead we decided to try a more innovative approach, one that appeared to afford greater intellectual coherence by facilitating closer integration between the two types of method, at the level of basic theoretical assumptions as much as at the practical level of

³ A copy of the topic guide used in meeting 1 can be found in the Appendices. The statements and scenario materials used in meeting 2 are reproduced in chapter 7.
⁴ For a review of NUDIST and a comparison with other qualitative data analysis software, see Weitzman and Miles (1995).
⁵ On inductive analysis of qualitative data see, for example, Strauss (1987); Miles and Huberman (1994).
⁶ A report of this workshop, held at Lancaster University, is given in Marris and Simmons (1995).
conducting the research.

The approach that we chose to use is Q-methodology. Q-methodology (or Q-method for short) offers an approach to the study of human subjectivity that we felt to be compatible with the focus group-based qualitative research that forms the core of this study. Its methodological foundations can be traced back sixty years and the method itself has been in use for more than forty years (Stephenson, 1935; 1953). Over that time the method has been used in a wide range of studies, including political, psychiatric, health and social research, and more recently in a number of studies concerned with risk perception. The nature of the approach and the assumptions upon which it is founded can most simply be outlined through a description of the method itself. For a more detailed introduction, see McKeown and Thomas (1988) or Brown (1993). Although the Q-method differs in significant ways from the psychometric techniques more widely used in risk perceptions research, it has been used in a number of relevant studies. The method may be unfamiliar to many. At the risk of giving an undue amount of attention to this aspect of our research design, therefore, we will outline briefly the advantages and disadvantages of using Q-method and also explain how the method is employed in practice.

3.4.1 Advantages of using Q-method

The key advantages of Q-method as far as integration with the focus group technique is concerned are that: (a) it begins from statements and arguments that people have made about major accident hazard sites, such as would be encountered in a group discussion, rather than from primarily theoretical concerns; and (b) it requires subjects to evaluate a diversity of often conflicting or incompatible positions and values in relation to one another, much as they have to do in their daily lives, rather than having them respond to or score each item in isolation. This also makes it more likely to capture the dilemmatic nature of everyday thinking (Billig et al., 1988). Thus, whilst neither Q-method nor focus groups are 'naturalistic' methods, they both attempt to facilitate the expression of complex and possibly contradictory views. A further advantage of combining the two methods in this way is that, having been stimulated to think about the local major hazard site in the focus group discussion, participants were able to make a more considered response to the Q-method exercise. In everyday situations people actually form and elaborate their views in an iterative way in response to contextual stimuli, whether those be events, personal interactions, the views of others or various forms of information. In cases where individuals had not previously given direct thought to the issues, starting the Q-method exercise 'cold' would have been more likely to result in arbitrary responses.

The analysis and interpretation of the individual responses to the Q-method exercise gave us a picture of the main patterns of response to major accident hazard sites, the results of which are discussed in chapter 6. Unlike the analytical approach taken in many of the psychometric studies of risk perception, the Q-method analysis was not restricted to an examination of aggregate data but also enabled us to identify individual differences where these were significant. The use of Q-method in conjunction with the focus groups also enabled us to make comparisons between the different research data, and to develop mutually constructive insights in the analysis of results. Not only did the focus group data provide a form of 'sensitivity analysis' of the results of the Q-method exercise, but the factors that emerged from the Q-method analysis were also useful in alerting us to patterns that could be explored in the

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8 This is acknowledged as being a shortcoming of much of the work in the psychometric tradition (Slovic, 1992).
analysis of the focus group data. Q-method is not, on the other hand, designed to enable us to make generalisations about socio-demographic segments of the population.\(^9\)

### 3.4.2 Limitations of Q-method data

Q-method, in common with psychological methods that use other research instruments such as questionnaires, can only present us with a 'snapshot' of the way in which someone responded to that particular stimulus in a particular context at a particular time. The danger with such methods is that they present us with a static image of people's attitudes and opinions. As we emphasised in the preceding chapter, although some people may hold very fixed views, attitudes and evaluations are often much less stable and are developed in dynamic communicational and experiential contexts. This is particularly the case where people are encountering or thinking about an issue which does not normally enter into daily experience and discussion. The participants in our research themselves commented on this when invited at the beginning of the second focus group meeting to reflect on their experience of carrying out the Q-sort exercise. Many of them pointed out that although they had taken pains to arrange the statements as carefully as possible, the pattern at which they arrived might very well be different were they to do it again at another time. This sense, which was apparent in the focus group discussions, of attitudes and judgements being subject to review and revision in different social contexts and in the light of different contingencies cannot be captured in the static depictions of a single Q-sort.\(^10\) This limitation was mitigated to a great extent by the combination of Q-method with the more dynamic focus group method.

As we have noted, adhering to the grid pattern used for the sorting exercise forces participants to make judgements that discriminate between statements viewed in relation to one another. However, some felt unduly constrained by the format into which the cards had to be sorted and observed that had the sorting exercise been unconstrained in this way they would have produced a very different pattern, with more statements in particular columns. This is a problem with all structured research instruments and echoes complaints often voiced by people asked to complete questionnaires, that the answer they would wish to give either falls between or else is not catered for at all in the response options available. When considering the results of the Q-method analysis in chapter 6 it is therefore important to bear in mind these methodological limitations.

In order to give a clearer picture of how Q-method works, it may be helpful at this point to describe the steps involved in the procedure. These comprise of sampling, devising a set of statements, administering the Q-sort exercise, analysing and interpreting the data.

### 3.4.3 Sampling

As it is applied in the majority of studies using quantitative methods, sampling refers to the principle of identifying and representing key categories of person from the relevant population of individuals. The questions or statements to which the subjects are asked to respond then

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\(^9\) Having said that, should any clear relationships emerge between the patterns of subjectivity revealed by the Q-method study and social location or identity, their robustness and implications can be explored.

\(^10\) Q-method does not in fact have to be quite so static. In experimental situations it is common practice for participants to be asked to repeat a Q-sort under various 'conditions of instruction' that specify different assumptions or conditions to be borne in mind when completing the exercise. For a variety of reasons this was not considered to be a viable or appropriate strategy to adopt in the present project.
become variables for analysis. Q-method approaches the problem from a different angle. In a Q-method study the 'population' sampled is the 'universe' of views or arguments expressed about an issue (rather than the population of individuals) - in other words, the available ways of talking (and thinking) about something. This approach recognises that the attitudes and concerns which people express about an issue draw upon and make sense within the social context of wider public discourse. When sampling this universe of views, thorough coverage is essential to ensure that all relevant views and arguments are identified and represented in the study. The first step in our development of a Q-method exercise for this study was therefore to collect examples of the different ways in which major hazard risks are talked about in a range of different contexts. These included newspaper articles, industry publications, official documents and previous interviews with residents living near major hazard sites.

On the basis of this search we arrived at a collection of statements (in Q-method terms a 'concourse') which grouped together under a number of broad headings. Each of these types of statement included both positive and negative positions or arguments. The examples collected included statements about:

- perceptions of risk
- fears or anxieties
- stigmatising effects on the local area
- toleration of risk
- trade-offs between risks, cost of reduction and benefits
- need for information
- familiarity with industry or site
- responsibility for accidents
- capacity to act to reduce personal risk
- trust/distrust of industry, regulators or 'experts' as risk managers
- trust/distrust of industry, regulators or 'experts' as sources of information

From this concourse we selected a sample of 42 statements to represent the range of positions and arguments that had been identified. Where necessary, the original quotations were edited to improve their clarity. The statements used were tested in the pilot study and revised in the light of that experience.

### 3.4.4 Familiarising respondents with the method

As will be apparent from the description given in the following section, Q-sorting is a more involved process than completing a questionnaire. In addition to demonstrating the procedure to participants at the end of the first focus group meeting, we therefore decided to familiarise respondents with the method by giving them a 'trial run' before asking them to complete the Q-sort relating to the major hazard sites. This was done by preparing a smaller set of statements expressing different attitudes to the area within which they lived, an issue about which the majority of people find it easy to express a view and which followed from the discussion that took place in the first part of the focus group. These statements did not make any reference to the local major hazard site. The materials for this trial exercise were given to participants to complete at home.

### 3.4.5 Q-sorting

Each statement in the Q-sample was printed onto a separate numbered card. The complete set
of 42 cards was presented to the individual participants to sort. Individuals were given clear verbal and written instructions as to the conditions of the sort (to sort the cards from those with which one agrees most to those with which one disagrees most) and asked to arrange the cards accordingly. They began by sorting cards into three piles (agree, disagree and don't know/uncertain/not relevant). Cards were then further sorted to approximate a normal distribution pattern, the dimensions of which were set by the researchers. When the sort had been completed the number of each card was marked onto a small grid which replicated the sort pattern. Individuals were also provided with a list of the statements on a separate sheet with accompanying spaces for any comments they wished to make. These comments, together with personal information given on an additional sheet, provided an additional source of data for interpreting the patterns that emerged.\textsuperscript{11}

### 3.4.6 Factor analysis and interpretation

When the Q-sort data had been collected, the numerical representations of the Qsorts (the pattern of card numbers) were input to a data file. The total set of Qsorts for each case study site was then subjected to factor analysis to identify the principal factors. This was carried out with the PQMethod 2.0 data analysis programme, using principal components analysis (PCA) with varimax rotation.

Once the factor analysis was completed an 'ideal' Q-sort was assembled for each factor. These factors represent distinct points of view, which to a greater or lesser extent were held in common by some of the participants. In order to facilitate comparison between sites the factor loadings for each of the individual case studies were combined as a new data set and subjected to a second-order (or meta-) factor analysis. This highlighted those points of view (factors) that occurred across sites and those where there were significant local differences. The interpretation of the factors was based on an examination of the different patterns of statements for each and also drew upon the data from the focus group discussions. The outcome of this process is outlined in chapter 6, where we discuss the results of the Q-method exercise. Before we turn to the results of the research, however, in chapter 4 we will first describe the case study sites and the localities within which they are situated.

\textsuperscript{11} A copy of the materials used for the Q-sort exercise is attached in the Appendices.
4. CASE STUDY SITES AND LOCALITIES

This chapter draws upon the background and contextual information collected to provide a brief description of each of the seven case study sites and the localities and communities within which they are situated. An important feature of our approach to the research and of the research design, as discussed in chapters 2 and 3, was to examine risk perceptions on the basis of a good understanding of the local context. This includes the history, development and present characteristics of the site and the locality, and the relations established between the company involved and the local community. In this respect we have concentrated in particular on those aspects which may be relevant to, or impinge in some way on public perceptions, rather than, for example, providing details of internal safety management practices and technical safety measures. It should be noted that the information on the case studies is principally as of the time at which the field research in each area took place. Table 4.1 provides a summary of key information about each of the case study sites.

Table 4.1
Summary Information on Case Study Sites

<table>
<thead>
<tr>
<th>Company</th>
<th>Site</th>
<th>Hazard Type$^2$</th>
<th>No. of Employees</th>
<th>Size</th>
<th>Year Established</th>
<th>Consultation distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albright and Wilson</td>
<td>Langley, Sandwell, West. Midlands.</td>
<td>CIMAH Toxic</td>
<td>600</td>
<td>55 acres</td>
<td>1851</td>
<td>750-1000m</td>
</tr>
<tr>
<td>Allied Colloids</td>
<td>Low Moor, Bradford, West. Yorks.</td>
<td>CIMAH Toxic</td>
<td>2000</td>
<td>42 acres</td>
<td>1953</td>
<td>300m</td>
</tr>
<tr>
<td>BOC Gases</td>
<td>Brinsworth, Rotherham, South Yorks.</td>
<td>NIHHS Flamm</td>
<td>c. 300</td>
<td>25 acres</td>
<td>1952</td>
<td>1000m</td>
</tr>
<tr>
<td>British Gas: LP Gas</td>
<td>Llandudno, North Wales</td>
<td>NIHHS Flamm</td>
<td>9 (max.)</td>
<td>5 acres</td>
<td>1969</td>
<td>300m</td>
</tr>
<tr>
<td>Esso refinery &amp; petrochemical complex</td>
<td>Fawley, New Forest, Hampshire</td>
<td>CIMAH multiple hazard</td>
<td>c. 2500+ + acres</td>
<td>3200 (refinery)</td>
<td>1920/1951 to 2 km</td>
<td></td>
</tr>
<tr>
<td>Rohm and Haas</td>
<td>Jarrow, South Tyneside</td>
<td>NIHHS Toxic</td>
<td>220</td>
<td>14 acres</td>
<td>1955</td>
<td>400m</td>
</tr>
<tr>
<td>Severn Trent Water Treatment Works</td>
<td>Frankley, Birmingham West Midlands</td>
<td>CIMAH Toxic</td>
<td>c. 60</td>
<td>c. 700 acres</td>
<td>1904</td>
<td>750m</td>
</tr>
</tbody>
</table>

1 Although the description of each of these areas includes some reference to the wider locality, the socio-demographic data all refer to the population living within the consultation distance (CD) around the site and are based on the 1991 census.

2 Indicates the regulatory category the site falls within and whether the dominant offsite hazard is toxic or flammable.
4.1 ALBRIGHT AND WILSON, LANGLEY, WEST MIDLANDS

4.1.1 Site and Company Information

The Langley site has a long history (from 1851) and its products and operation have developed and changed over the years. A&W was originally a local family-run firm but is now a multinational company with its headquarters close to the Langley site. Recent investment at Langley has included new phosphine capacity, new chlorine handling and storage facilities and a combined heat and power (CHP) plant. The site is large, covering 55 acres, and has approximately 600 employees. The company is an active member of the CIA.

4.1.2 The Locality

The site at Langley is adjacent to the M5 motorway and just to the south of Oldbury town centre. Langley is part of what is known as the Black Country and has a long industrial history and a strong sense of local identity. The CD for the site covers an area of mixed residential, industrial and retail uses, with a substantial residential population of approximately 7,980. The socio-economic profile of the local population is mixed, although overall the level of prosperity is relatively low, with unemployment at 15% and heads of households predominantly skilled or semi-skilled manual workers. Ethnically, the area is predominantly white but has growing Sikh and Bangladeshi communities, which account for about a fifth of the total population. Much of the housing has been built in the past fifty years and about 60 per cent of homes are owner-occupied.

4.1.3 Relations between site and community

Building on the ethos of the company's Quaker founders who were important local benefactors, A&W attaches great importance to relations with the local community. It has held a number of open days, provides regular plant tours and talks and periodically distributes a newsletter, containing both company news and CIMAH information, to about 8,000 local households and business premises. It is also involved in a variety of community activities such as tree planting and environmental improvement schemes. Following a number of problems in the early-1970s, the company established a residents' liaison committee in 1975. The committee meets 3-4 times a year and is usually attended by 10-12 local residents, along with local councillors and representatives of a number of local organisations. The number of complaints from the public logged by the company has been falling steadily over the past few years from 25 in 1990 to only one in the six-month period ending March 1996.

4.1.4 Hazard information

Albright & Wilson (A&W) at Langley is a CIMAH site holding chlorine (50t), phosphine and about 200 tonnes of other toxic material. The principal hazard is toxic from the chlorine storage. The consultation distance (CD) for planning developments around the site extends to between 750 and 1000 metres from the site boundary. Prior to March 1994 the CD was 2 km. It was reduced due to a reduction in the volume of chlorine stored on site following the introduction of a 'just-in-time' delivery system.
4.1.5 Local Planning

The plant and much of the land within the CD is part of the Black Country Development Corporation (BCDC) area. The focus on local regeneration has meant that there have been a comparatively large number of development proposals raising safety concerns. Over the years the HSE has advised against a number of sensitive developments within the CD but the local authority has frequently rejected this advice. In none of these cases, however, did the HSE consider the risk to be of sufficient significance to exercise its powers to refer the application to the Secretary of State. The HSE’s advice against development has however featured in a number of public inquiries and appeals. The conflict between safety concerns and strong pressures for redevelopment in the area led eventually to BCDC loaning money to A&W to help finance a reduction in chlorine storage at the site so that the CD could be reduced in extent and the number of problematical planning applications minimised.

4.1.6 Emergency Planning and Public Information

As a CIMAH site A&W has a full off-site emergency plan. Although it is a CIMAH site, A&W does not have an off-site emergency siren (although one is shortly to be installed). CIMAH information has been distributed every two years and has evolved from a simple leaflet back in 1986 to a more substantial emergency action card.

4.1.7 Accidents at the site

There have been various small fires, explosions and releases over the years. Most of these have had no off-site consequences but many have come to the attention of local residents through media coverage. A number of incidents in 1973/74 provoked particular concern. The most dramatic incident at the site occurred in August 1995, eight months before our research in the area, when an explosion blew the top off a phosphorus pentoxide plant. Local people report that some debris from the plant was blown over the site boundary. The incident took place on a hot summer evening, so many local people were out of doors and both heard the explosion and saw the thick plume of smoke that was released. The police subsequently toured the area nearest to the plant asking people to stay indoors with their windows closed as a precaution. The company made various immediate responses to this incident, including sending out staff to deal with questions or complaints about health impacts and property damage. The accident was the subject of an HSE investigation that did not result in prosecution.

4.1.8 Environmental Problems

The works has historically long had a problem with smells, which are seen as a major influence on perceptions of the site. Nevertheless, HMIP/the Environment Agency has received relatively few local complaints about smells and the problem has been greatly reduced in recent years. On the other hand, Friends of the Earth named A&W as fifteenth in its list of the 100 most polluting companies in Britain. This claim was made on the basis of data contained in HMIP’s register of authorisations for all the company’s sites, with discharges from its Whitehaven operation particularly significant. There was, however, no mention of this claim by the local people who participated in our focus groups.
4.2 ALLIED COLLOIDS, LOW MOOR, BRADFORD

4.2.1 Site and Company Information

Allied Colloids was founded as a company in 1935 and moved to Low Moor in 1953. When Allied Colloids first opened at Low Moor, it consisted of only a few small buildings and the operation employed only 50 people. Since this time Allied Colloids has been an economic success story developing into a multinational operation with facilities in nine overseas countries. As a consequence the scale of operations at Low Moor has grown enormously. The company now covers a densely packed 42-acre site and has over 2,000 employees. In 1995 the company estimated that it contributes more than £50 million every year to the local economy through wages, taxes and rates and it is now the second largest employer in Bradford. Many of its employees live locally, although to a lesser extent than in the past. Although Allied Colloids only became a member of the CIA fairly recently, company representatives have been attending meetings of the local Responsible Care cell for some time.\(^3\)

4.2.2 The Locality

Allied Colloids is located in the middle of Low Moor, once a village but now an outlying district of Bradford, three miles directly south of the city centre. There has been industry at Low Moor since the 18th century, taking advantage of local iron and coal deposits. By the 1950s most of this traditional industry had disappeared and Allied Colloids took over as the dominant industrial operation in the area. Today Low Moor is seen as a close-knit community that has tried to keep its own identity. The CD around the site mainly covers housing, most of which existed when the plant was first built, although there were some substantial additions made during the 1960s and early 1970s. About 1,900 residents currently live within the CD. This population is fairly mixed but overall of average prosperity. Housing in the area is almost all owner occupied, with less than 6 per cent rented. Unemployment is uniformly low in the area averaging less than 6 per cent. Ethnically the area is 98 per cent white.

4.2.3 Relations between site and community

Allied Colloids has been the focus of public concern and complaint for at least the past twenty years. Various city councillors and MPs have taken up residents’ concerns about smells, environmental and accident risks over the years. The Wyke and District Campaign Against Pollution (WADCAP) has been a long standing and vocal source of protest (although it has very few active members). WADCAP gained considerable local media coverage in 1989 when it lobbied for a 50% rate reduction for residents living near the site because of a claimed fall in property values. About 60 households were successful in gaining reductions but many of these were awarded for reasons other than the presence of Allied Colloids and in many cases the amount of the reduction was fairly small. Claims about the effect of Allied Colloids’ presence on residential property values also re-emerged following a major accident in 1992 (see below).

The accident in 1992 also led to substantial and ongoing media coverage and a flurry of local community action including public meetings and petitions. The company’s attempts to establish good relations with the local community have been reinvigorated since 1992. It has appointed a community liaison officer to develop and co-ordinate its local activities and in 1995 it launched

\(^3\) Since the research was completed Allied Colloids has been take over by Ciba but in the interests of consistency we have continued to refer to the company by its original name.
a newsletter, which has seven local residents from the liaison committee on its editorial board. In a departure from the more traditional site open days, a major ‘fun day’ was held in September 1994 next to the plant. 5,000 people reportedly attended the event, about 500 of whom toured part of the site in small groups. The company has been increasingly proactive in supporting local community initiatives and activities. These have included, for example, funding for a CCTV security system, linked directly to the company’s own security control room, at a nearby school - an initiative which received considerable media coverage and a public endorsement from the Chief Constable of West Yorkshire. A community liaison committee has been in place since 1978, although attendance declined and had to be revived in 1984. The committee meets three or four times each year and between 12-24 local residents typically attend. Allied Colloid’s figures show public complaints to be declining dramatically, from approximately 250 public in 1994, to 126 in 1995 and only 8 in the first quarter of 1996. The company now has a free telephone ‘hotline’ number which residents can call.

4.2.4 Hazard information

Allied Colloids at Low Moor is a CIMAH site and has consent to hold up to 450 tonnes of acrylonitrile and up to 40 tonnes each of methyl chloride and trimethylamine. These materials are flammable and in certain specific conditions can explode, as well as all having potential toxic effects. The CD around the site extends to approximately 300 metres from the site boundary. There is another nearby major hazard site, agrochemical manufacturer A. H. Marks, whose CD overlaps to a small extent with that of Allied Colloids.

4.2.5 Local Planning

Expansion of the Allied Colloids works in Low Moor has been achieved by taking over existing industrial sites, requiring no permission for change of use. In May 1989 there was local opposition to the expansion of the site to accommodate Allied Colloids' Atlas Interlates agrochemicals subsidiary. Objections were also made to the large new warehouse built to replace that destroyed in the 1992 fire. No recent on-site or nearby developments have been objected to by the HSE on hazard grounds. There is little pressure for development in the area around the plant.

4.2.6 Emergency Planning and Public Information

As a CIMAH site there is a full off-site emergency plan in place. The company has an off-site siren to alert local people and regularly distributes CIMAH information. The circulated leaflets were developed in consultation with the city council and A. H. Marks.

4.2.7 Accidents at the site

Prior to 1992 there had been occasional small explosions, fires and releases at the site that have received local press coverage. In July 1992, the company came to national attention following a major warehouse fire. 42 people, including both Allied Colloids and emergency services personnel, were taken to hospital. The fire caused damage to the plant estimated at £6 million. A thick plume of smoke from the fire blew eastwards from the site. Local watercourses were polluted by the run-off of contaminated fire-fighting water, killing thousands of fish. As a precautionary measure local people were warned not to eat fruit and vegetables from their own gardens and allotments. Subsequent monitoring of soil, grass, groundwater and crops by the Council’s environmental health department did not reveal any harmful contamination, although
the results of these tests took two or three months to come through. The incident resulted in a highly publicised prosecution by HSE, which led to the company being fined £100,000 in January 1993. The company's handling of the incident, in particular, the delay in activating the emergency plan and poor communication with the emergency services, was the subject of much public criticism. When the company was fined for the fire, one Labour councillor maintained that local residents should have received compensation for the stress and nuisance caused by the fire, but this was not actively pursued. One local resident did go as far as to sue for compensation for "serious trauma and recognisable psychiatric illness" but when the case came to court in 1996 it was unsuccessful.

Since the fire in 1992, the company has made a £2 million investment in improving safety. This has included the construction of a covered reservoir to ensure an adequate water supply in case of a future incident, a new water treatment system and the erection of a new warehouse complex at the western end of the site. There have been several small incidents at the site since 1992, all of which have received local media coverage.

### 4.2.8 Environmental Problems

Allied Colloids uses a number of organic substances, including acrylonitrile, which have an extremely pungent smell. This has over the years been the source of much public complaint and press coverage. There have also been problems with and prosecutions for discharges into water. In 1990 the company first established a formal environmental policy and in 1994 embarked on an innovative pilot pollution prevention scheme in co-operation with HMIP.

### 4.3 BOC GASES, BRINSWORTH, ROTHERHAM, SOUTH YORKSHIRE

#### 4.3.1 Site and Company Information

BOC has been operating at the Brinsworth site since 1952, when it was set up to produce and supply oxygen and other gases to the local steel industry. By 1963 BOC supplied oxygen via a 13-mile long pipeline to 5 steelworks in the Sheffield and Rotherham area. The site is now part of BOC Gases, which is in turn part of the BOC Group. The BOC Group is a highly successful international company, recording substantial growth and expansion through the 1990s. Brinsworth is one of a number of BOC Gases sites across the country and has maintained and expanded its profile whilst some others have shut down (e.g. the smaller nearby site in Rotherham and the Widnes liquid oxygen production facility). Despite the contraction of the local steel industry Brinsworth agreed a 15-year contract for the supply of oxygen to local companies in 1994. In addition to liquefied oxygen production, liquefied and gaseous nitrogen is recovered from the air separation process and LPG cylinders are filled with both gases distributed by road. The site covers 10 hectares, and has approximately 300 employees, with half of these based in an office block at the front of the site away from the production processes. Whilst precise figures are not available, there are some employees who live in the nearby communities around the plant (very roughly estimated at a sixth of the total).

#### 4.3.2 The Locality

The site is located right on the border of the administrative boundary between Sheffield and Rotherham. Partly for this reason the population within the CD around the plant is divided into
two fairly distinct communities, separated by areas of open land used largely for sports activities. In total approximately 2700 people are resident within the CD around the site.

On the Sheffield side, the community of Tinsley has its origins in the iron and steel industry that has historically dominated the Lower Don valley. The major steel works that extended out from Sheffield reached the area around 1900 and housing was rapidly constructed to accommodate workers from nearby plants such as the Templeborough steel works. The core of the community was added to in the post-war period by substantial development of semi detached housing and some flats extending down to the BOC site. The community is bordered to the North by the old steel works and railway lines, to the West by an elevated section of the M1 motorway and to the South by a busy main road and by railway sidings. People living in this area are now located closest to BOC with a line of housing extending immediately alongside the site’s western boundary. The high towers of the BOC site are visible across much of the area. Tinsley has over the years suffered from severe social, economic and environmental problems with poor quality housing and high levels of pollution from local heavy industry. The population is predominantly white but unlike Brinsworth 10-15% is of Afro-Caribbean or Asian ethnic origin and in recent years there has been some racial tension.

On the Rotherham side of the site, is Brinsworth. Originally a village dating back to the 15th century, its population expanded with the growth of local industry and was then surrounded by the suburban growth of Rotherham in the 1960s and 70s. Although located on the Rotherham side of the boundary, the BOC site is less immediately close to Brinsworth and due to topography is not visible from most of the housing.

A comparison of the socio-demographic data for the two communities shows Tinsley to be the poorer of the two, with unemployment four percent higher at 10%, a higher proportion of households without cars or central heating. Although semi-detached housing predominates in both areas, Brinsworth is again distinct from Tinsley in that it has virtually no terraced housing but about 15% of the housing stock in the area studied consisted of detached properties. In both areas the majority of properties were owner-occupied but the percentage of rented properties was noticeably higher in Tinsley (about 20% as compared with six percent). The proportion on non-manual workers was also slightly higher in Brinsworth.

Common to both Brinsworth and Tinsley and the area in general is a close historical relationship with both coal mining and the steel industry, followed by the economic and social impacts of massive de-industrialisation as these industries contracted and declined. Whilst some environmental improvements have resulted from the closure of heavy industry, new developments on areas of derelict land - including the large Meadowhall shopping centre, a nearby open cast mine and a planned airport - have caused local controversy.

4.3.3 Relations between site and community

In general the company has had a low profile in the area. There has been little coverage in the local media. The only local information exercise carried out prior to the research related to the construction of a new plant and other site refurbishment in 1993. When this was first announced in 1992 the company invited local residents to a talk and slide show explaining what was to be happening at the site. There is no local liaison committee for the site and no open days have been held. The company occasionally donates money to local community groups.
4.3.4 Hazard information

The BOC site at Brinsworth is a NIHHS site with consent to hold 1,750 tonnes of liquid oxygen and 384 tonnes of LPG (a number of other gases are also held in non-notifyable quantities). The principal hazard at the site is presented by the enhanced combustion effect of oxygen enrichment. Since 1994 the CD around the site has extended out to 1 km. This represented an increase from the previous 500m due to an increase in the quantity of liquid oxygen stored and a reassessment of the risks involved.

4.3.5 Local Planning

The site falls within the area of the Rotherham MBC unitary plan with the CD also extending into the Sheffield MBC area. The development plans for the two areas have no specific policies on major hazards relating to the site. There have been few development pressures within the CD over recent years and no cases in which the HSE has advised against approval of planning permission. The development at the BOC site in 1993 and doubling in extent of the CD generated no documented discussion or concern within the LPAs or in any other public arenas.

4.3.6 Emergency Planning and Public Information

As a NIHHS site, there has been no requirement to distribute information on risks or emergency action to local people. There is also no full off-site emergency plan. It appears likely that, as a consequence of the inventory aggregation rules to be introduced under the forthcoming COMAH regulations, the site may be reclassified as a ‘top-tier’ hazard and therefore be required to issue emergency action information to the public.

4.3.7 Accidents at the site

There have been no documented accidents at the site with any off-site effects of any nature, and no significant release of liquid oxygen. In the course of the research an accident took place at a BOC plant near London, which required some evacuation of local residents and was reported briefly in the media. The event caught the attention of one or two of the focus group participants and was mentioned in a subsequent meeting.

4.3.8 Environmental Problems

The operations at the BOC site produce no significant regular emissions or smells. There have been some complaints from local people in the past about emissions from a coal-fired boiler, but these stopped once an oil-fired boiler was installed. There are occasional complaints about noise, although these appear to have declined with the re-siting of cylinder filling operations.

4.4 BRITISH GAS LP GAS, LLANDUDNO, GWYNEDD, N. WALES

4.4.1 Site and Company Information

The LPG storage operation was first established in 1969 associated with a pre-existing Wales Gas Board low pressure gas holder facility (the last gas holder was removed in 1995). The
operation now consists of the bulk storage and distribution of LPG to customers in the north-west Wales area. There is no longer any cylinder filling at the Llandudno site, with LPG delivered by tanker from its refinery source and distributed by 4 tankers operating from the site. The site is physically small and employs only a manager, 2 technicians and 6 drivers in the winter. British Gas LP Gas was recently established as a separate company as part of the reorganisation and break-up of British Gas plc.

4.4.2 The Locality

Llandudno is a well-established coastal resort town that is largely dependent upon the seasonal tourist trade. The LP Gas site is located towards the southern side of the town, in a predominantly residential area away from the seafront and main tourist facilities. The CD contains a total residential population of approximately 1,470 people living in a mixture of terraced and semi-detached houses and a number of blocks of flats. Much of the nearby housing and the blocks of flats were built in the 1970s after the LPG storage was in place. There is also a school, scrap yard and playing fields within the CD and further schools and a hospital just beyond it. Census data shows a high proportion of council and housing association rented properties within the CD, high unemployment (up to 21%), low car ownership and ethnically the population is 99% white. In various respects the local population is not typical of the North Wales coastal area, which has a larger number of retired, middle-class residents.

4.4.3 Relations between site and community

Over the last few years there has been little publicity given to the site. However, in the mid-1970s it received considerable political and media attention prompted in part by the 1974 accident at Flixborough. In 1975 Wales Gas sought to buy extra land to increase LPG storage. A local pressure group was formed to oppose this generating local media attention and support from local Plaid Cymru politicians. As the campaign extended to removing the site altogether, the local MP took the matter up in House of Commons and there was also some national media reporting on the controversy. Locally Wales Gas undertook various public relations initiatives including meetings with local politicians, teachers and the holding of a site open day. In addition, by 1978 the company had developed an off-site emergency plan in conjunction with the local emergency services. This led to discussion about the possibility of relocating the site, an option that was not considered to be feasible at the time, although the question was raised again in the 1980s. In the 1990s the site has received little similar attention, although there were some concerns after the IRA attack on the gas storage site in Warrington. Partly as a result of this event, additional safety and security measures were introduced at the site, including automatic gas detection and 24-hour security cameras. The company has not recently felt the need to undertake any specific community relations activities although there is some small-scale sponsorship of local community activities.

4.4.4 Hazard information

British Gas LP Gas at Llandudno is a NIHHS site with consent to hold 660 tonnes of LPG, although only 150 tonnes of storage capacity are now in place. The site was CIMAH top-tier until 1995 when the LPG inventory was reduced. The CD around the site extends out to 300 metres from the LPG tanks. This was reduced in 1995, having previously been 400 metres from the site boundary, following a revised assessment of the off-site risks.
4.4.5 Local Planning

Although much of the housing around the site, including several blocks of flats, was built after the LPG storage was introduced, this had mostly been granted planning permission before 1972 when the site became a recognised major accident hazard. There has more recently been infilling of and extensions to the established housing but this has not led to refusal advice from the HSE. A planned extension to a nearby primary school in 1994 did however lead the HSE to recommend the refusal of planning permission, but the LPA decided on balance to allow it to take place. This decision did lead to some local media coverage.

4.4.6 Emergency Planning and Public Information

As LP Gas was previously a CIMAH site, information in the form of a letter and emergency action card had been circulated to local people from 1986 onwards with the last distribution taking place in 1995. An off-site emergency plan was also in place, and although no longer covered by the CIMAH requirement the company has agreed to maintain the off-site siren and local emergency planners intend to maintain and update the off-site plan as necessary.

4.4.7 Accidents at the site

There have been no accidents at the site with any form of off-site impact.

4.4.8 Environmental Problems

The site operations involve no regular emissions or smells. There had in the past been some complaints about occasional smells and noise when vessels were being decommissioned but this activity no longer takes place at the Llandudno site.

4.5 ESSO REFINERY AND PETROCHEMICAL COMPLEX, FAWLEY, HAMPSHIRE

4.5.1 Site and Company Information

The petroleum industry first came to Fawley in 1921 in the form of a small refinery. As a result of a succession of take-overs, the site was owned five years later by the Anglo-American Oil Company. By 1939 the refinery’s capacity had only grown to 600,000 tons of crude oil a year. In the post-war period Britain could no longer afford to import the bulk of its refined petroleum products from the USA and Anglo-American was invited by the government to build additional refining capacity. Nearly 3,000 acres of additional land were bought for the development. In 1951, the year that Anglo-American changed its name to Esso, Britain’s first major oil refinery - with an annual capacity of six million tons - came on-stream at Fawley. By 1976 annual capacity had risen to 19.5 million tons, making it still the largest refinery in the UK and one of the largest in Europe - it has now though declined to 15 million tonnes. As the refinery expanded the production of petrochemicals became an increasingly important part of its activities and in 1966 the chemical business came under the management of a new company, Esso (now Exxon) Chemical Ltd.

4 Less than half of the extensive Esso site is currently developed.
In the 1970s the refinery complex reportedly employed more than 3,000 people. However, the number of direct employees has been reduced in recent years. By 1997 the number of employees at the Esso Petroleum Company (EPCo) refinery had reduced to about 800 and at Exxon Chemical to 540. The workforce is augmented by the employment of about 500 contractors.

Historically there has been a difference in the cultures of EPCo and Exxon Chemical when it comes to relations with the public. Whereas EPCo had been rooted in a sometimes paternalistic but relatively closed relationship to local communities, since the late 1980s Exxon Chemical has embraced the new chemical industry creed of openness and proactive communication, as promoted through the Chemical Industry Association’s Responsible Care programme. The two companies have, until very recently, maintained separate structures for dealing with health, safety, environment and public communication issues at the site. EPCo and Exxon Chemical’s approaches to community relations are now aligned.

In the 1950s other companies were invited to establish related activities in the area to the north-west of the refinery. There have been various changes over the years but in addition to the various Exxon companies – EPCo, Exxon Chemical, Naeco Exxon and Essogas – neighbouring companies currently include: BOC, Calor Gas, Enichem Elastomers, International Speciality Chemicals and Rechem Environmental Services, which operates a toxic waste incinerator. Along the coast to the south-east of the complex is National Power’s oil-fired Fawley power station, which was criticised in 1992 by Friends of the Earth for its level of sulphur dioxide emissions but which has been operating at half capacity since then.

4.5.2 The Locality

The Fawley petrochemical complex is situated in what is known as the Waterside area, which runs along the south-western side of Southampton Water. Waterside is bounded to the north-east by the Water and to the west and south-west by the New Forest. Southampton Water is heavily used by large ships and tankers, as well as by recreational sailors. The New Forest is one of Britain’s busiest areas of natural beauty, attracting millions of visitors every year, and is recognised as a habitat of international importance.

Waterside consists of several villages. To the north is Marchwood, which has a naval base, a shipyard and has been home to a controversial municipal waste incinerator which is no longer operational. In the middle of Waterside are the villages of Hythe and Dibden which, as they have grown over the years, have all but merged. To the south end of the area are the villages of Holbury and Hardley (which have also merged together), Blackfield, Langley and Fawley. The Fawley complex stretches along the coast from Hythe to Fawley, with Holbury and Hardley bordering its south-western perimeter.

The recent history, economic and social development of this area is inextricably bound up with developments at the Fawley complex. Waterside first began to attract migrant labour from the rural areas of the county in the nineteenth century, drawn by employment at the shipyards. This did not have a dramatic effect on the villages of south Waterside, however, and Fawley in the 1920s was still described as ‘an old-world village’, surrounded by unspoilt farming country. With the advent in the 1950s of major industrial development centred on the Esso refinery the area began to change. In 1951 the population of Fawley parish (which includes Fawley, Langley and Blackfield) was 6,515. By 1961 this had risen to 7,685 and by 1981 to around 12,300. Dibden parish experienced even more dramatic growth, from 3,112 in 1951 to 9,803 in 1961 and to an estimated 23,400 in 1981. As early as 1962, scarcely 10 years after the new
refinery commenced operations, there was local concern in the local Chamber of Commerce about the extent to which the local economy was dominated by the petrochemical industry.

The multi-site CD designated around the complex takes in most of Fawley and Holbury but does extend to include Hythe or Dibden. Socio-economically the population within the CD shows some contrasts. Most of the area is fairly well off, with some high proportions of detached housing and car ownership. In some parts though the profile is very different, with high unemployment (up to 26%) and rented properties predominant.

4.5.3 Relations between site and community

The impact of the petrochemical complex’s presence on the locality has been considerable. The economic impact was felt in a number of ways. The income collected from EPCo/Exxon by the local authorities under the former business rating system has been considerable. For 1976, it was estimated that New Forest District Council received £2 million, a proportion of which was passed on to Fawley parish council. Another estimate from 1976 suggested that local purchases together with the wages and salaries of the 2,000-plus employees, many of whom lived in the vicinity, injected a further £8,500,000 into the local economy. With changes to the system introduced in the 1990s the local community no longer benefits from this substantial source of income. As a consequence council tax rates have increased significantly and are now reckoned by local people to be among the highest in Hampshire.

In the 1960s the Fawley refinery was established as a national model for good industrial relations practice and has long enjoyed a local reputation as a good employer. As noted above, however, organisational changes in recent years have led to a reduction in the workforce. This, together with the fact that more people now commute to work from outside the area, has attenuated the links between local communities and the companies in the Fawley complex. Many local people have also been critical of EPCo’s decision not to subsidise the local cinema, originally built in the 1950s for Esso employees, which has now had to close.

Since 1996 EPCo and Exxon Chemical have issued a twice-yearly joint community newsletter in response to requests for more information about the site. Exxon Chemical is an active participant in the local Responsible Care cell and has also held educational open days for local school children. Both companies have a sponsorship scheme that enables Exxon employees to request grants on behalf of local initiatives and groups. There is a liaison committee that meets with representatives of the New Forest District Council. The committee does not include members of the public in its membership, but one of the four annual meetings is open to public attendance.

4.5.4 Hazard information

Although the EPCo/Exxon refinery complex dominates the area there are, as we have already noted, six other chemical and gas storage sites clustered between the site and Hythe. All of these sites are classified for regulatory purposes as containing major accident hazards. However, only the EPCo/Exxon refinery site has a CD that includes a significant population. As a consequence the refinery complex was the focus of our research in the area. The hazardous materials held at the complex include both toxics (chlorine, bromine and ammonia) and flammables (LPG and a range of highly flammable gases and liquids). The CD extends up to approximately 2 km from the principal hazardous storage.
4.5.5 Local Planning

There have been a number of planning appeals and inquiries associated with applications to build or develop properties within the Fawley CD, which have brought the safety issues to public attention through local involvement or media coverage. At an inquiry in the early 1980s the inspector overruled the local authority and approved a proposed housing development on the grounds of public choice. Since then, however, in cases where the HSE has advised against approval its recommendations have been upheld and the approved local plan for the area includes explicit policies on exercising strict development restraint. The most recent events have included a public planning inquiry held in 1992 following a decision to refuse planning permission for a residential development within the 1 km CD and in 1995 the refusal of an application to extend the sixth form centre at Hardley School. In 1995, the publication of Exxon’s planning application to move its chlorine store to a safer location within the complex also provoked a petition from the neighbouring area because some people were concerned that the relocated store would be nearer to them than before.

4.5.6 Emergency Planning and Public Information

There is an off-site emergency plan, developed in consultation with the emergency services. There is also an on-site fire crew. EPCo and Exxon issue a joint CIMAH information card at regular intervals that gives instructions on how to act in the case of an emergency and is accompanied by a leaflet that gives brief details of the major accident hazards at the site.

4.5.7 Accidents at the site

There have been numerous incidents over the years of which local residents will have been aware, and many of which were covered by the local press. One of the most dramatic was the 1969 powerformer fire, which was attended by 80 fire engines and 300 fire-fighters drawn from South Hampshire and neighbouring counties (there had previously been powerformer fires in 1962, 1965 and earlier in 1969, and a further big fire in 1965). In 1985 there was another powerformer fire and in 1986 a fire in a process unit, which produced a 25-metre vertical flame jet above the tank. In 1993 there were several incidents involving airborne releases from the EPCo refinery, including catalyst dust, soot from the steam plant furnace and a release of oil mist that was deposited on Holbury. That same year a release from the Exxon Chemical plant of mercaptan, a substance with an extremely unpleasant smell that reportedly induced vomiting in some individuals, provoked strong public reaction. In 1995 a release of sulphur dioxide led to local complaints.

4.5.8 Environmental Problems

There have been local concerns about various aspects of the site’s operations. From the beginning there were concerns about the visual impact that this major industrial development would have on such a rural area - and one in which the aesthetics of the landscape hold such importance. As the refinery was constructed, therefore, a tree belt was planted all the way around the landward perimeter of the site. Whilst this does not completely conceal the visible presence of the complex, it does provide a screen between the refinery and local residents.

A large proportion of the refinery’s products is transported by pipeline. When these pipelines were laid (all pre 1980s), there were local concerns expressed and sometime opposition, in particular where they were crossing the New Forest.
Other sources of environmental nuisance to local residents have been odours and airborne particulates emanating from the site, road traffic-related problems and, for those living nearby, occasional noise from the site. All complaints are investigated and dealt with promptly, sometimes by public relations personnel and at other times by technical staff, depending on the nature of the complaint. Exxon Chemical at Fawley currently receives about four or five complaints each year, although the company logged 31 complaints in 1993 following the mercaptan release. The Esso refinery also received a large number of complaints (188) in 1995 but 121 of these concerned just two incidents.

Oil spills from tankers and pipelines at the refinery jetty have also been a recurrent feature of local news coverage and environmental concern over the years, although there have been few in recent times. These have included two or three spills in 1989 and 1990, and another in 1994 that required boat cleaning at Hamble.

There have also been occasional public complaints and concerns associated with incidents at the other chemical production sites. In addition, Rechem has received a lot of adverse publicity because of controversies associated with its operations at other UK locations. Although not a primary focus of the research, the Rechem site was mentioned by a number of participants as causing concern, with the most recent source of public anxiety being a proposal to incinerate BSE-infected cattle at the site.

One of the most contentious issues in recent years, however, has been the question of local air quality. Concern was fanned by a regional TV documentary broadcast in 1994, which cited research by a Southampton college and linked emissions from the complex with public health problems, notably asthma. A local health survey did not produce any conclusive evidence of higher levels of asthma than elsewhere, and an independent study commissioned by HMIP in response to these concerns did not find levels of organic pollutants to be significantly higher than those found at other industrial locations. Nor did it find industry to be a significant contributor to those pollutants. The report concluded that the ambient levels of organic pollutants did not represent a hazard to health.

4.6 ROHM & HAAS, JARROW, SOUTH TYNESIDE

4.6.1 Site and Company Information

Rohm and Haas is an American owned multinational with 7 sites in Europe and 2 in the UK. It has been operating at the Jarrow site since 1955, originally under the name of Charles Lennig and Company a subsidiary of the parent company acquired in the 1920s. Although there had been a substantial chemicals industry on the Tyne and within and around Jarrow in the 19th century, this had entirely disappeared by the time the new site was set up. The plant was extended during the 1960s and in 1973 the site name was changed to Rohm and Haas (UK) Limited. A further new plant was started up in 1983 for the production of an isothiazalone biocide and it was at this point that the storage of chlorine first began. The site currently covers about 14 hectares extending along the south bank of the River Tyne.

The Jarrow site employs approximately 220 people making it one of the biggest employers on South Tyneside. The majority of employees do not live in Jarrow but travel in from various parts of Tyneside and the environs. This level of employment has been fairly static over the last few years although it is significantly less than in the 1970s. The plant currently produces 3
families of chemicals which diversify to more than 100 different speciality chemicals for a wide variety of end uses. More than 70% of production output at Jarrow is exported to markets outside the UK. Transport to and from the site is by both road and sea. There are approximately ten road tankers in and out of the site per day, with 3 tankers per week carrying chlorine from ICI plants either in Teesside or Cheshire. Tankers follow a route pre-agreed with local authorities around the local ring road avoiding the town centre area. The company is an active member of the CIA and heavily involved in Responsible Care activities and initiatives.

4.6.2 The Locality

The site is located close to the centre of Jarrow on the bank of the River Tyne. Jarrow has historically been an area of heavy industry - coal, shipbuilding and heavy engineering. It suffered badly in the 1930s depression when unemployment in the area reached 74% but fared much better post-war. However, since the 1960s mining has disappeared and the decline of shipbuilding has led to massive losses of employment. The CD takes in about half of the central area of Jarrow covering a total residental population of approximately 1,950. Nearly all of the Victorian terraced housing was cleared and replaced from the 1950s onwards by a mix of houses, maisonettes and flats. Over 70% of properties are now council housing. The area has high unemployment levels (25% overall with some parts over 50%), the population is ageing and declining in numbers. Various indicators show that households are largely poor and of low social class, whilst ethnically the area is 99% white. Jarrow has a range of problems associated with poverty and high unemployment, including ill health, poor housing and high levels of crime.

4.6.3 Relations between site and community

In 1988-89 considerable local protest began following submission of a proposal for planning permission for a factory expansion. The protests centred on odour problems from the site linked to possible health effects and to detrimental impacts on local businesses. This led to fairly frequent reports and letters in the local paper. Petitions were presented to the council, meetings were held between councillors and regulatory bodies and representations were made by, among others, the local Friends of the Earth group. The company’s responses to these concerns included meetings with local councillors and residents, a promise of extra investment to deal with odour problems and an information leaflet distributed to local households. The local council also set up a 24 hour ‘odour hotline’ in May 1989 supported financially by Rohm and Haas. The company also initiated an air sampling programme in support of the local environmental health group. The company reports that the number of complaints received from the local public has recently been reducing. Data included in the Rohm and Haas European Environmental Report show the number of complaints falling from a high of 93 in 1990 to 28 in 1994 (24 related to odour and 4 to noise). Local authority representatives also perceive the company to have substantially improved community relations.

Since 1993 the company has produced a quarterly newsletter with a target distribution of 20,000 households. The company has been increasingly involved with sponsoring and contributing to a range of local organisations and community projects. An open day was held in 1985 to celebrate 30 years of operation at the site and then repeated in 1986 as part of the Chemical Industries Association’s ‘open door’ initiative. Following significant investment in vapour scrubbing and aqueous effluent treatment facilities, a further open day was held in 1992 to celebrate the inauguration of these facilities. No further open days have been held since 1992. A local residents’ action group became the foundation for the Community Advisory Council set up by the company in late 1989. It currently meets bimonthly and its membership
of between 15-20 includes 7 local residents, 4 who were part of the original residents action group and 3 who are local ward councillors.

4.6.4 Hazard information

The Rohm and Haas site at Jarrow is a NIHHS site and has consent to store 18 te of chlorine and 30 te of flammable gases and liquids. The principal hazard is toxic from the chlorine storage. The CD around the site currently extends out to about 400m from the site boundary. This was reduced in 1994 from 1 km following reassessment of an upgrade to the chlorine installation.

4.6.5 Local Planning

The R&H site is located in the Tyne and Wear Urban Development Corporation area, but is also covered by the South Tynedale BC Unitary Development Plan. This has a substantial section on hazardous installations and some specific policies relating to R&H reflecting the recent history of public concern. In terms of ongoing planning applications in the vicinity of the site, there are comparatively few sent to the local HSE office (only 6 mid 1995-mid 96) and none of these have recently been the source of any objections on hazard grounds.

4.6.6 Emergency Planning and Public Information

Whilst the company has comprehensive on-site emergency plans, because of its NIHHS status it is not required to have an off-site emergency plan. Again in accordance with the site’s NIHHS status, there is no off-site siren for alerted the public, and despite the recent local communication initiatives no information on what to do in the event of a chlorine release has been distributed. The advent of the COMAH regulations in 1999 will require that this position is reviewed by the company.

4.6.7 Accidents at the site

There have been no recent accidents at the site with significant on-site or off-site consequences. In the local HSE’s view this has been a ‘quiet’ site for some time. The most serious accident going back 34 years was an explosion in 1964. Decomposition products of residue at the bottom of an empty tank led to an explosion whilst three men were working on the top of the tank. All three were killed with one blown off the site and through the roof of an adjacent house.

4.6.8 Environmental Problems

As discussed earlier odour problems have been a major issue in the area. Pollution of the Tyne has also featured in local press coverage and discussions between local bodies and regulators. The company has been fined on one occasion for releases into the Tyne and this received local press coverage. In addition, Rohm and Haas was identified as one of the allegedly 'filthy 50' worst polluters of the environment by Greenpeace in 1993, during a national campaign to draw attention to the discharge consents being authorised by the then HMIP and National Rivers Authority. This 'allegation' was strongly contested in local press coverage by the company and a local councillor.
4.7 SEVERN TRENT WATER TREATMENT WORKS, FRANKLEY, WEST MIDLANDS

4.7.1 Site and Company Information

The treatment works and associated storage reservoirs were built in 1904 for Birmingham Corporation. The site, which is now owned and operated by Severn Trent, treats water piped from the Elan Valley reservoir in mid-Wales and provides the main water supply for Birmingham. The total land area of the works and reservoirs is approximately 700 acres. Severn Trent employs 50-60 people at the site, and has a further 50-60 based there, few of whom live in the local area. Recent investment at the site has included a major new water treatment facility costing £53 million.

4.7.2 The Locality

The site is located on the south-western edge of Birmingham, about one and a half kilometres east of the M5 motorway. Much of the CD contains the rest of the water treatment works and reservoirs and unpopulated agricultural land. However, to the east of the works and on higher ground the CD includes a densely populated area of housing that includes six high rise and numerous smaller blocks of flats, totalling more than 1,200 households. Most of this residential area is taken up by a council housing estate constructed in the 1950s and 1960s, with the majority of properties still rented from the local authority. The population is predominantly of low socio-economic status and today the area is seen by many as a ‘sink’ estate with substantial social and economic problems. Census data for 1991 show a population that is relatively young and ethnically is 95% white, with high scores on various indicators of social deprivation, including high levels of unemployment (42% in one census enumeration district) and low levels of car ownership. There tends to be a high turnover of tenants in some of the council accommodation. Apart from the housing there is also a small farm situated in the green belt to the south-west of the site which is run as a children’s activity centre.

4.7.3 Relations between site and community

Although Severn Trent features frequently in the local media, the Frankley site has received very little publicity. What little recent media coverage there has been about the site has concerned the new, state of the art water treatment equipment. There was reportedly some media attention given to a Friends of the Earth campaign which made incorrect claims about the site’s safety reports but this resulted in only two telephone calls and does not seem to have made an impression on the local population. The company did at one stage hold annual open days, which attracted up to 3,000 people, but reportedly these were stopped due to HSE concerns about public safety. In 1992 Severn Trent submitted a proposal to construct a visitors’ centre at the site, in part to enable the company to bring in local residents and inform them about operations at the site. However, again the HSE objected because of the level of risk to which members of the general public would be exposed as a result and the development has not gone ahead. No other notable community relations activities have been pursued at the site.

The local authority received a number of complaints in 1994 from a local resident and community worker about the lack of consultation on the off-site emergency plan and about the delivery of chemicals to the site at night but there is no record of other complaints to public authorities. The company reports that there have been problems with vandalism at the site and occasional attacks (stone throwing, etc.) on members of staff by local youngsters.
4.7.4 Local Planning

There has been little development pressure within the CD area, as much of the open land is protected as green belt. The HSE has not registered objections to any of the housing developments that have taken place although, as noted above, it did object to the development of a visitors’ centre at the site.

4.7.5 Hazard Information

The Severn Trent Frankley works is a CIMAH site which has consent for and holds up to 34 tonnes of chlorine for water treatment. The CD extends to approximately 750 metres from the chlorine store.

4.7.6 Emergency Planning and Public Information

As a CIMAH site, information has been distributed to local residents via the City Council approximately every 3 years. The most recent circulation took place in June 1997, three months before the focus groups with local residents were held. This information takes the form of a detailed letter from the Council and an accompanying laminated card, produced by Severn Trent, that gives emergency action instructions. An off-site emergency plan, which has been prepared in consultation with the County Emergency Planning Unit and the emergency services, is also in place.

4.7.7 Accidents at the site

There have been no accidents at the site involving the chlorine storage or involving any off-site impacts.

4.7.8 Environmental Problems

There were no reports of environmental problems associated with the site.

4.8 CONCLUDING REMARKS

A comparison of these case study sites highlights the diversity of situations that were studied. The sites varied enormously in their economic significance to the locality, in their significance to and impact upon the identity of the area in which they were located and in their accident histories and relations with the local community. As we shall see in the following chapters, these differences were found to be significant for the ways in which local people perceived and evaluated the sites and the hazards that they presented.
5. PUBLIC PERCEPTIONS AND ATTITUDES: FOCUS GROUP DATA

What do people feel about living in close proximity to a major hazard site? What influences their perceptions and understandings of major hazard sites and how do they express those views in discussion? In this chapter we address these questions through a thematic analysis of the focus group data. In Chapter 2 we noted that recent research has identified trust in those responsible for risk management and agency (the power to influence one’s circumstances) as two particularly important social influences on public perceptions of risk. Questions of trust and agency proved to be so pervasive in the focus group discussions, and were expressed in so many ways in different conversational contexts, that we treat these as themes which run explicitly or implicitly through all of the issues addressed below, before addressing them directly in the final sections of the chapter. To begin with, however, we will outline the analytical framework that informs this chapter.

5.1 CONTEXT, EVIDENCE, REASONING

In Chapter 2 we argued that public perceptions of and attitudes towards major hazard sites are best understood in terms of discursive processes. Public perceptions are informed and shaped by dialogical processes of reasoning and argumentation, whether explicit or tacit, which operate in particular social and spatial contexts and draw upon various resources and forms of ‘evidence’. This formulation provides the basic structure of the chapter, which will look in turn at the relevant contexts, forms of evidence and argumentational repertoires that are mobilised in the production of public perceptions of risk. We illustrate the chapter with selected quotations from the focus groups, although to keep the report to a reasonable length they have been used rather sparingly.¹

The simple model that we adopt here is one in which context (at various levels), evidence (in various forms) and different forms of reasoning about risk all interact and shape each other to varying degrees. For example, whether we take something to be ‘evidence’ of a risk depends upon both the context within which it is viewed and our criteria of relevance. Changes in context may alter what counts as evidence, as may changes in our criteria. Conversely, new evidence may lead to changes in our criteria or in the way in which we evaluate context. Similarly, just as contextual changes and observed events may induce emotion, so too our emotions and intuitions may direct our attention to particular forms of ‘evidence’. And on the basis of these processes we produce stories and arguments about the world. This is the case whether we are scientists in laboratories or ‘lay’ people going about our everyday life.

5.2 CONTEXT: MAJOR HAZARD SITES AND THE LOCALITY

The contextual approach that we have taken in this study directs us first of all to consider how major hazard sites figure in the local landscapes of everyday life. Although our primary concern here is with public perceptions of the risks associated with these sites, focusing exclusively on risk perceptions will capture only a very limited sense of what the site represents.

¹ In the quotations we employ the following conventions: speakers are identified as male (M) or female (F); where the speaker was identifiable from the tape recording a number is added (e.g. M2) and where this was not possible an X is added (e.g. MX); the source of each quote is identified at the end by location, group number and meeting (e.g. Fawley, Group 6, Meeting 2).
to a local community. Taking this broader perspective will produce a more complex picture but it is one that needs to be appreciated if we are to understand and account for local responses to any risks that the site may present. In the preceding chapter we described briefly the nature of each site and the history of its social and economic relationships with the local community. These different contexts produce very different local perceptions of the sites and different levels of awareness of the hazards that they contain.

During the first of the focus group meetings participants were asked to list the good and bad things about living in the area. Some of the general sources of local concern which recurred across most or all of the groups included loss of local employment opportunities, the decline of local shopping centres, poor public transport, lack of facilities for young people, and poor service provision by local authorities.

There were also a number of risk issues, other than those associated with major accident hazards, which were identified as a source of concern by people in different areas, including: crime (particularly burglary, car theft, mugging, sexual assault and, in two areas, paedophile activity); road traffic (associated with accidents, noise and air pollution); and air pollution from local industrial activity.

5.2.1 Awareness of the major hazard site and of the specific hazard

When it came to the local major hazard site, there were clear differences in the salience of the different sites in local concerns. The site which received by far the most spontaneous mentions as a bad feature of the area was Allied Colloids at Low Moor. This was followed by Albright and Wilson at Langley. Significantly, there had been high profile accidents at both of these sites in the relatively recent past. The explosion at Albright and Wilson had occurred only seven months before the focus groups were held. The fire at Allied Colloids had been four years before our research took place but because of the scale and circumstances of the event had had a proportionally greater impact on local people’s perceptions of the site. Both sites, in common with the other chemical production sites, were also associated by local people with unpleasant odours.

After these came Esso’s Fawley refinery, which some local residents associated with odours, pollution and the risk of explosion (although several people professed to being far more concerned about the presence of a nearby toxic waste incinerator). Of the remaining sites, Rohm and Haas at Jarrow was also mentioned by one or two people in connection with odours. The rest - BOC at Brinsworth, LP Gas at Llandudno and the Severn Trent water treatment works - were only mentioned as a detrimental feature of the area once or twice in this initial exercise but in each case this was associated with the potential for a major accident. In general, however, these sites were relatively low profile and were scarcely thought about in the course of everyday life in the area.

Local awareness and knowledge of the specific substances that brought these sites under the major hazard regulations was very low or even non-existent at most of the locations we studied. The notable exceptions were Brinsworth and Llandudno, where many people were aware of the gases stored at the local sites and were familiar with their uses. At Brinsworth people also learned about what was produced at the BOC plant simply by reading the signs on the lorries going to and from the site. A few people at Langley and at Frankley were aware of the presence of chlorine at their local site but the knowledge was not widespread. No-one at Low Moor, Jarrow or Fawley mentioned the specific substances which constituted the major off-site hazard.
These differences in levels of awareness or local discussion of the sites have important implications for the way in which people talk and reason about the risks associated with them. In those places where the sites were a subject of local comment and discussion people had access to a well-developed repertoire of arguments and narrative ‘evidence’, unlike those where the site did not enter significantly into local culture.

5.2.2 Major hazard sites and local senses of place

The presence of a major hazard site may make itself felt in the everyday life of a community by impinging on people’s sense of place. That is, it impinges upon local feeling about the area in which they live, the identity of the area, and the image that it presents to people from outside the locality. The case study sites were positioned very differently in local senses of place.

The low profile sites - BOC, LP Gas, Frankley water treatment works and Rohm and Haas - did not figure significantly in local senses of place. On the other hand, at two sites - Albright and Wilson at Langley and the Esso refinery complex at Fawley - there were some positive associations with local identity, relating in each case to the company’s close ties to the history of the area and its employment of local people. In both cases, the community had grown up with and around the company, which had in the past employed significant numbers of local people, and there was a perception of a close relationship between the development of the company and that of the community. In both cases, as a result of industry restructuring, reductions in the numbers employed at the site and in the numbers recruited from the local community there were discernible signs that these positive associations were becoming increasingly attenuated.

Such positive associations can have a significant influence on local responses to the hazards presented by a site and their erosion should be a cause for concern for those responsible for risk management at such sites. They remind us that the social context within which a site is embedded is not static, so that an area where there is little sign of antagonism may become much more hostile if the relationship between company and community is subject to change.

Some sites had distinctly negative associations with local senses of place. This was most evident where the site was identified as the source of unpleasant odours that were associated with the identity of the locale (Langley and Low Moor). In addition to occasional odour problems, some of the residents living near the Fawley refinery also saw it as a visual blot on an area otherwise characterised by the natural beauty of the New Forest and of its coastal areas. Where there is a marked sense of the identity of a place having been spoiled, for whatever reason, we are confronted with the problem of stigma.

5.2.3 Stigma

Economic impacts can be a useful indicator of stigma but they do not capture the nature of the process itself nor do they register all of its impacts on a local population. Goffman’s (1964) characterisation of stigma in terms of ‘spoiled identities’, which we discussed in chapter 2, brings us rather closer to the mark. From this perspective economic blight, which has been the focus of many of the recent papers on the stigmatising effects of technological installations, may be seen therefore as a possible consequence of stigma rather than its sum total. To understand the nature and impact of stigma in the localities that we studied it is also helpful to differentiate between different sources or types of stigma.

The first type of stigma affecting some of these communities is social stigma, which was felt
particularly strongly in Jarrow and Ley Hill Farm, the council estate adjacent to the Frankley water treatment works. It was also evident in the Sheffield district of Tinsley, next to the BOC works at Brinsworth. As described in Chapter 4, all of these areas are characterised by considerable social deprivation associated with high levels of crime, one consequence of which was that both neighbourhoods had a bad name in the wider locality, a stigma that transferred itself to local residents. For people living in these areas their everyday concerns with these social problems and any associated stigma effects may well have displaced attention from the local major hazard site and even overshadowed or masked such concerns as existed.

The other form of stigma is technological stigma, arising from the presence of a stigmatising technology. As past research has shown, chemicals in general are both a stigmatised and a stigmatising technology. Popular associations with the word ‘chemical’ are notions such as toxic, polluting and waste. The presence of a chemical production site in an area may potentially, therefore, arouse negative associations for many people simply because of these cultural associations.

The one area where a very clear sense of stigma was associated with the local major hazard site was Low Moor, where the company's presence and, in particular, its notoriety since the fire in 1992 is perceived to have had a negative impact on the identity of the area:

*Female 3: I live in Low Moor. They go Ugh. Mm.*
*Male 2: Yuck. That’s the attitude.*
*Female 4: People who don’t know us.*
*Male 2: Allied Colloids is the first answer back to you.*
*Male 3: Yeah.*
*Male 2: Allied Colloids, Oh Allied Colloids is there.*
*(Low Moor 4.1)*

*Male 4: Er but I can see that point because er Allied Colloids is a centre piece in the Low Moor. It it it, it overshadows every single. If people’s talking about Low Moor you can bet they’re talking about Allied Colloids, you know.*
*(Low Moor 4.2)*

One local professional even confessed that for this very reason she had on occasion claimed to live in a neighbouring area that enjoyed a better image, rather than admit that she lived in Low Moor. The site’s presence was also claimed to have had a detrimental effect on local house prices and had been the basis for a local campaign for a reduction in council tax rating on local properties.

These examples of stigma effects in terms of spoiled place identity highlight the mundane but pervasive ways in which the presence of hazardous sites can in some circumstances intrude on the awareness and quality of life of members of a community and in the process colour their perceptions and evaluations of a particular site.

We can see, therefore, that in various ways the local context is significant for people’s perceptions and evaluations of a site. In forming their views, however, they also draw on a wide variety of sources of knowledge and information that are to hand in that context. In the following section we outline the main forms of ‘evidence’ which people employed in the course of the focus group discussions.
5.3 EVIDENCE: KNOWLEDGE AND INFORMATION

When evaluating the ‘evidence’ about a major hazard site people do not tend to compartmentalise one area of experience from another, particularly where risk is concerned. Accident risks, health risks, environmental risks, even employment risks, are often packaged up together. This may be awkward where an institution is attempting to communicate or reassure about one aspect of a site’s operations but people make their interpretations and judgements on the basis of several others. The different forms of evidence that are utilised may themselves be woven together in various ways. So, although we present each separately in what follows, these are simply individual threads in a richer and more complex web of local culture within which meanings are produced and attached to the local major hazard site.

5.3.1 Local memory

Existing sites rarely have a completely clean slate and may find it impossible to wipe that slate clean. This is particularly true of complex chemical production sites.

Impressions and judgements of a company persist in collective local memory and can be found in a variety of forms, such as stories, jokes and old company names. We can find numerous examples from the case studies. At Low Moor we heard about the Low Moor explosion which saw the destruction of the local chemical works in 1915 with considerable loss of life. In Jarrow we were told many versions of a story about an explosion at Rohm and Haas in the 1960s, in which three men died, one of them being hurled off the site and through the roof of a house in a neighbouring street.

Male X: I know it’s a dangerous place ‘cos in nineteen-sixty-three
Male X: It went up.
Male X: it went up.
Moderator: Oh. Go on.
Male X: And three lads got killed. And one
Male X: One went through the roof didn’t it.
(Jarrow 4.1)

Male X: Well it’s already blew up once before hasn’t it?
Male X: Yeah
Male X: Blew that bloke up though into the next street
Male X: I was only two or three
Male X: He was killed wasn’t he
(Jarrow 2.2)

At Fawley several people told us about a fire in the cracker at the refinery. At Langley there were tales about phosphorous fires, buried chemical waste, and about net curtains and women’s tights that simply disintegrated because of emissions in the air.

Entwined within these locally specific narratives are elements of more widely diffused discourses and representations, many of them negative, associated with chemicals, the chemical industry, risk and technology. Such local memories may seem little more than a bit of local colour, stories of events long past and no longer relevant. But from a cultural perspective they represent an important resource. Collective memory has an important social function in linking people together through a shared history, but it also secures continuity ‘with what they think they know in order to be able to deal with what they don’t know’ (Hamer, 1994, emphasis...
added). As a consequence it can play an important constitutive role in shaping responses to situations where a community is faced with risk and uncertainty.

These culturally persistent associations present a challenge for risk communication, particularly where it is concerned with reassuring members of a local community about the safety of a particular site.

5.3.2 Incidents and accidents

Accidents can thrust sites that had become simply part of the local context into people’s awareness, arousing concern where none existed before and focusing background anxieties. And as we observed above, once these events become established in local memory, their influence tends to persist. Irrespective of their actual consequences, incidents are often taken as indicators of the riskiness of a site and of the incompetence and untrustworthiness of the people managing those risks.

As we have already noted, two of the sites at which we carried out research - Allied Colloids and Albright and Wilson - have had relatively serious incidents within the last few years, although no-one was injured in either. In both cases the incidents figured prominently in focus group discussions and coloured people’s views of the company.

Female 1: I never worried about it. I mean I never liked the smoke in the atmosphere. I never worried about it until they did have an incident. I never really, it never crossed my mind. (Low Moor 3.1)

The Allied Colloids fire was associated at the time with considerable uncertainty about the contents and effects of the plume of the thick smoke that emanated from the site. The company’s handling of the incident at the time apparently did not inspire confidence in its competence or its honesty amongst local people, and subsequent criticisms of poor communications with the emergency services were also aired in the local press. Following the HSE’s accident investigation the incident was also the subject of an HSE report which received considerable local attention. Discussions in the focus groups revealed that local people were well aware that there had been uncertainties about what was being released by the fire and that monitoring of the chemical composition of the smoke plume had not taken place at the time. The fact that a warning had been issued to local residents not to eat produce grown in their gardens or allotments made quite an impression on some people and was taken as confirmation of the dangers associated with the company’s presence in general as much as with the specific incident. So, although the company has made very laudable efforts to recover local trust, it is unlikely that the deep impression that has been left on local perceptions will be entirely removed for the foreseeable future.

Although the Albright & Wilson site has had various on-site incidents over the years, particularly involving phosphorus, at the time that our research began there had been no incidents with off-site consequences. The most recent incident of any note had been a phosphorous fire in 1990 but this had taken place late one cold, wet night when most ‘local residents were indoors and had attracted relatively little attention. The incident in August 1995 took place on a hot summer’s evening when local people were out in their gardens enjoying the good weather. The explosion was clearly audible and the plume of smoke visible to those living

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2 The fact that subsequent monitoring by the local authority had turned up no evidence of toxic contamination in local vegetation and livestock was not mentioned in the focus groups.
near to the plant. From discussions of the incident it was clear that the experience had clearly alarmed and unsettled many people, and in many cases shaken their confidence in the company and the emergency services. The following quote, which illustrates this well, is from a long-standing local resident who in the course of the focus group had expressed a very pragmatic view of the company of its presence:

Male 2: But the biggest gripe I’ve got with Albright & Wilson is when they had that explosion [pause] with and it was brilliant. Absolutely superb. I sat in my garden I heard one hell of a noise and I thought it was a plane crash and I think it most that was what most people heard. And so I went upstairs looked out the window and there was this lovely great big black cloud coming out of it. I couldn’t have give a damn whether it was whatever. The fact was that it was a black it could have been smoke for all I cared. But there was a black cloud coming out. I’d got the card off them stating what to do in case of an emergency. “Shut all your doors and windows stay inside”. Brilliant idea. Great. I shouted out the window to all the children and the, the neighbours who couldn’t see what I could see ‘cos I’ve got this chemical works view you see. It was Albright & Wilson. And they didn’t need telling. They all went inside shut their doors windows. Twenty minutes later I heard in the distance “Keep your doors and windows” - The bloody cloud had gone. Brilliant. Twenty minutes later they come round and tell you to shut your doors and windows. If you’ve got double glazing you can’t hear them anyway. [...] Best part of all it was the one of the hottest evenings of the summer. At two o’clock in the morning they still hadn’t put come round and told you to open your bloody windows. I went round to my neighbour and sat on his step against all the regulations. By rights I should keep my doors and windows shut ‘cos I’m going to get toxic fumes in my body. And we sat having a glass of beer at two o’clock. Everybody else is sweating like I don’t know what because they’d got their doors and And at six o’clock six o’clock the following day nobody in Langley should have gone to work because we hadn’t had the all clear from Albright & Wilson. “Ah the cloud’s gone. Push your doors and windows. Oh you’re all dead. Sorry.” Brilliant. Absolutely superb. [laughter] (Langley 2,1)

On the other hand, several people acknowledged that the company had responded positively to local concerns raised after the event, sending out senior members of staff to reassure residents.

It is also important to note, however, that one encounters very different versions and accounts of these incidents. Events are constructed and reconstructed in the light of different concerns and contexts and similar stories may be told to make a very different point. For instance, Albright & Wilson received a number of complaints that a sticky deposit had been left on the cars of people downwind of the plant at the time of the accident. The company responded by offering to clean the vehicles or, where paint work was actually damaged by the acidic deposit, to pay for the cost of a re-spray. During the focus group discussions accounts of this exercise were told both as illustrations of the company’s responsiveness to local concerns and, by the more sceptical, as an example of a cynical PR exercise which did nothing to mitigate the risks to which they felt themselves to be exposed. Similarly, in both Langley and Low Moor the incident had been simply an inconvenience or even a spectacle for some, whilst for others it was a very worrying experience. In other words, local communities do not necessarily share a common experience of an incident. The experience is contextualised in different ways. For some, caught away from their homes at the time of the incident, it involved an anxious attempt to negotiate traffic jams and even roadblocks in an attempt to get home to their children. To someone else it was the dilemma of whether to stay with their business or rush to check that their family was safe.
5.3.3 Sensory evidence and inferences

The presence of a site impinges on local awareness in more pervasive ways through the odours, sights and sounds which are taken as more everyday forms of sensory 'evidence'.

5.3.3.1 Odours

Of the different forms of sensory 'evidence', odours often have the biggest impact. The affective impact of odours can be very powerful and bad smells are closely associated with cultural notions of contamination and pollution. Smells are the most pervasive way that the presence of an industrial site can be impressed on local awareness, ensuring that even a plant that is out of sight is not necessarily out of mind.

Offensive odours were the most frequent source of complaint at all of the chemical production sites that we visited, although the incidence of releases seems to have been reduced at all sites and not all of the unpleasant odours about which people complained emanated from the site in question. Quite apart from the nuisance they created and their effect on local amenity, the offensiveness of odours was often taken as an indicator of something that was harmful to health; for example, they were linked to discussions of air pollution and the prevalence of respiratory complaints, especially in children.

Female 3: you can walk down to t' shop erm and one day I mean you've got to hold your mouth and your nose because you're breathing it in and it, it smells and tastes so disgusting. If you're breathing it in it's obviously must be doing summat to you. (Low Moor 3,1)

Female 2 [...] because you think cor blimey something couldn't smell like that if it were harmless. (Low Moor 3,2)

The issue of smells also came up in the context of comments about air pollution and the prevalence of respiratory complaints, especially in children:

Female X: Oh we've all got bad chests. And all my kids have. And you see we don't know the that smell that comes out of there if it's doing anything to us. 'Cos nobody's ever explained the smell.
(Jarrow 2,2)

Female X: [...] He shouldn't have it like that all the time you know. He's only two but he shouldn't have it a cold all the time and I think it's something to do with that, especially his cough from him playing out. 'Cos when he comes in he's coughing all the time and stuff.
Moderator: Right. And you, and you kind of associate that with the smells. Mm.
Female X: Yeah. Because it's, most of the time his cough's really bad it's when it's the smell's really bad.
(Low Moor 3,1)

Rather infrequently a few people made a clear distinction between the nuisance of unpleasant odours and the possible dangers to the local community that might be presented by a serious accident at the site. In general, however, as we observed earlier, people tended to package together their various concerns about the site.
5.3.3.2 Sights

We live in a culture in which visual metaphors are closely associated with knowledge and knowing. It is a culture in which the expression "I see" has long been a metaphor for understanding and in which 'seeing is believing' has long been an axiom. If a major hazard site becomes a focus of concern, for whatever reason, some people are inclined, rightly or wrongly, to construe things that they see there as evidence of hazard or harm.

At several of the production sites, but most notably at Langley, plumes of 'smoke' emanating from the sites were frequently mentioned as a cause of concern and as evidence that the site was polluting the environment - despite the fact that in most instances the plumes that were visible were steam.

Female 1: Erm but I mean like what [male name] says, Albright & Wilson, it's like you know you can actually see, when, when the wind's blowing in our direction the smoke's like, you know, the, the pollution and that. I mean they I know it's been there for years and, you know donkey's years, doing what they do but the thing is I mean they're not going to come out and say that this stuff is harmful. Like in fifty years' time you know we're going to [pause] get summat really er devilish you know and Although we didn't know about it at the time you know what I mean. That worries me about Albright & Wilson. (Langley 8,1)

Strange sights associated with chemical plants are also cues for concern. For example, residents of Low Moor recounted stories of seeing orange snow and even of workers who were vividly coloured by the chemicals at a another chemical works in the area.

Visible signs of positive or negative conditions in the local natural environment are also taken as indicators of the extent to which a plant might be affecting the local population. In Langley some people referred to the apparently healthy condition of local trees and of the adjacent canal as evidence that the site could not be having a detrimental impact on the locality, although another participant took the rich algal bloom observed on the canal following the Albright and Wilson explosion as evidence of phosphate contamination. For fishermen in Jarrow it was the state of the River Tyne and particularly observations of salmon with blackened gills or dead invertebrates that indicated to them that there was contamination from the neighbouring site. In Fawley it was the state of the New Forest or of the nearby beaches.

Ironically, visible security measures taken to maintain plant safety, such as wire fences and warning signs, can also be construed as indicators of the presence of danger and a cause for anxiety.

Female 3: Well I think, I think it's more worrying because you don't know exactly what they're doing in there. 'Cos like they've got all the security and all over the place. Like the look of it's daunting and you can't be sure exactly what's going on in, in there. (Low Moor 3,1)

Even seeing nothing at all can be taken as evidence of hidden threats. For the group of young women in Jarrow, Rohm and Haas was something of an enigma which provoked references to the X-Files.

Female 1: It's an, an alien... 'Cos you never see anybody going in
Female 2: X Files
Female 1: Or coming out.
Female 3: Aye the X Files.
Female 4: Mm.
Female 5: Yeah.
(Jarrow 2,2)

While the image is far-fetched, the underlying association with mystery and secrecy is clear, and one which the chemical industry has been attempting to shed for some years.

5.3.3.3 Sounds

Sounds from a site are more often a source of nuisance to close neighbours. For example, people at both Fawley and Brinsworth mentioned being disturbed at night by the background operating sounds of machinery at the site. But for some of those living near to CIMAH sites the sound of on-site sirens can provoke anxiety. Among those who mentioned being concerned when hearing sirens at the site, there was clearly some uncertainty whether they were hearing alarms to alert the public of a major incident or simply sirens being sounded for internal site management reasons.

Female X: Yeah, it does, but sometimes when the siren goes off it might only be for the dinner time and like we used to look up and think what's that [...] You think, oh, it's only the dinner time siren but sometimes if you sat and thought about that blowing up you'd drive yourself mad, wouldn't you, so you just put it to the back of your mind and hope it...(Brinsworth 6,1)

Female X: One of the things that causes panic, certainly with children at school sometimes, they have various alarms and sirens that go off at different times of the day. Are they hazardous to... Is it a warning to people outside the refinery, is it just a warning to those working inside it, you don't know. (Fawley 1,2)

The fact that some people reported being alarmed or concerned indicates that, for them at least, there were anxieties associated with the site that were triggered by such noises.

5.3.4 Company image and company information

The local image of a company is shaped by a diversity of factors. Local people glean fragments of information about a company from a wide variety of sources, although sometimes these are assembled to produce a rather distorted picture. For example, one older participant from Langley gave us an account of Albright and Wilson that mixed information, exaggeration and myth in equal measure:

Male 2: They're the biggest manufacturers of chemicals the world has ever known. Albright and Wilson. Not particularly here but as a company. They make the deadliest gasses that's ever been known for warfare, all the rest of it. Now here it is out of seven hundred and fifty companies it's the only place where they manufacture and develop phosphorous and other certain chemicals which are dangerous. If they're mixed or they escape and mix, up to a three-mile radius on the initial explosion let alone the fallout is wiped out. It's completely wiped out. [...] And within the three-mile radius everything in that is dead. Is demolished. And then you've got the fallout of the gasses and all the rest of it. And whichever, depending on which way the wind's going obviously. Could be north south east or bloody west but wherever the winds carry that gas then whoever's in that path, it's end of story. It's, it's a bloody time bomb. And one of these days it's gonna to go
off. They've got experts in there - they've got erm and er - I have worked in Albright & Wilson, but only in a building capacity. Erm but they have got very stringent rules and regulations in there. Erm a lot of places where you just can't go unless you've got the right calling card on your, your jacket. But if anything does go up it's going to be catastrophic. It's a living time bomb there.

[...]
Female 1: They've got chlorine down there.
Female 3: As [he] was talking about.
Female 1: They have the chlorine they've got chlorine they've got lorries going in
Female 3: Tankers of chlorine.

[...]
Male 2: They manufacture the world's most deadliest things at this plant here. And that is in a book which was printed about the most deadliest chemicals where they were manufactured and like I said Albright & Wilson isn't just a local factory. The home base is in America. And they have seven hundred and fifty other countries or companies around the world. World wide. But the most dangerous gasses and chemicals are manufactured in Langley. And not a lot of people know that.

(Langley 6,1)

One can trace the hints at weapons manufacture and government secrecy to the production of phosphorous bombs at the site during WW2. The reference to a three-mile radius 'blast zone' and the potential for an explosion that would wipe out the whole area appears to have been based on inaccurate memories of emergency planning information presented to a local planning inquiry and old CIMA leaflets. The reference to the 'deadliest chemicals known to man', supported by references to the stringent precautions, was based on a mixture of the previous sources, visits to the plant as a contractor, conversations with employees and publications produced by Albright and Wilson's erstwhile American parent company. The account is rather lurid and exaggerated but it highlights rather well the diversity of sources of information on which people draw (although rarely is the result such spectacular misinterpretation).

It is important to recognise that company 'image' may be a very complex and multi-layered construct. Companies may be simultaneously judged as local employers, as 'citizens' within the community and as sources of hazard, and all of these judgements tend to interact with one another. The larger companies such as Allied Colloids, Albright and Wilson, and Esso/Exxon were all mentioned as good employers who offer attractive rates of pay. However, as we noted earlier, changes in employment patterns at the latter two sites are affecting their image in the community in ways that are likely to impinge on local toleration of the risks associated with their presence.

So although the image of a company is of considerable importance for the way in which local people perceive any risks associated with its operations, the production of an image cannot be ensured simply by a good public relations campaign. People take account of many unintended (and therefore uncontrolled) signals - including a company's unspoken 'body language' in its dealings with the community - when forming their views about risk.

As we have already noted, chemical companies in particular are often perceived as mysterious and secretive. In general, all of the chemical production sites laboured to a greater or lesser extent under the burden of a generally negative public image - a problem that has long been recognised by the chemical industry - and this undoubtedly informed the way that many people construed information about them. Both the industry nationally and individual local companies are attempting to counter this view by increasing public understanding of their activities. Several of the site operators - Albright and Wilson, Allied Colloids, Rohm and Haas,
Esso/Exxon - issued newsletters to the local community, in addition to any CIMAH information. By contrast, local residents at Frankley perceived Severn Trent in a much more positive light, both because of the clean water that it produced and because compared to the local authority it was seen as being far more responsive to local concerns.

These same sites had also held public open days to demystify the site and its activities and to convey a safety message. It is apparent from comments made in some of the groups that open days can be an effective way of increasing familiarity and changing some people's perceptions of the site.

Female 5: Yeah, I must say before I went around there I thought it was all radioactive sort of stuff you know.

[laughter]

Female 5: And top secret and that. But it's not at all. You know I'm really glad I went around there because it's just generally household things. (Langley 8,1)

As well as endorsing the open day strategy, this quote is interesting for the, once again, rather sinister image of the company that the speaker professes to have held before visiting the site. It is also worth noting, given that this refers to Albright and Wilson, the reference again to 'top secret'. However, where trust is low and people are very suspicious, open days may leave them unconvinced:

Male 4: Er going round there on an open day, all the things I saw I considered to be safe. But the question being what goes on beside the things I saw. I mean they showed us making toothpaste and this that and the other. All harmless things. But what do they do besides that. What was the things they didn't show and that. I believe you should know.

Moderator: Is there any way that you could be convinced that they'd shown you everything? I mean if they said 'This is all there is'. I mean is there any way you could feel that you could be sure that was right?

Male 4: [laughs]

Female X: No.

Male 4: No. Not one hundred per cent. No. (Langley 5,2)

Hence, the image of secrecy is not necessarily dispelled by site visits or open days, where access restrictions to certain areas simply confirm the views of those who believed that they were not being told 'everything' about what goes on at the site. At one site this view was even expressed by a local resident who regularly attended community liaison committee meetings.

This feeling of not being told the whole story was often widespread, with the more sceptical focus group participants expressing considerable ambivalence towards company-generated information. Typical comments included "they never tell us what we want to know", "they only tell you what they want you to know", "they don't give any information about the risks", etc.

Several companies also engaged in sponsorship of various community activities. However, these activities (whatever form they took) were interpreted and responded to in very different ways:

- as evidence of the company's concern for the local community, openness and to an extent trustworthiness
- as the community's 'right' to some form of compensation for damage done
- as cynical attempts to placate or buy off the public
For example, the following comments, made by retired people living in Low Moor, about Allied Colloids' community activities are very positive:

Male X: Yeah I think it's good.
Male 3: What they're fighting for, Allied Colloids, is community relations
Male X: Yeah.
Male 3: they want to build that up as
Male X: And they're doing a lot to
Male 3: as quick as they can.
Male X: towards getting.
Male 3: by doing what they are doing they are bridge building. I, I've got to give credit
Male X: Yeah.
Male 3: there you know.
(Low Moor 4,1)

Male 5: Another thing I feel about, another thing I feel about Allied Colloids is, we've said I think, we all agree that they're doing good things in this area for shall we say for customer relations
(Low Moor 4,1)

However, this next passage from a group of young mothers in Low Moor captures a sense that, although local people may appreciate the company's community involvement and intentions, it is not really addressing their concerns about safety:

Female 3: I think they do try to make an effort with the local people. You've got to say that. But they're doing it in ways that don't reassure you. You know they do things for the community but what you really want to know is what's going on at the factory and what safeguards are in place to prevent any major incident. But...That's the kind of thing you really want to know. But it's good that they
Female 5: If we were given more information about what's going on at Allied Colloids and you know instead of just them telling us what they've been you know what they've done for the community whatever
Female 3: People'll always think the worst won't they. I don't think that fear'll go away until they address that really.
(Low Moor 3,1)

Or in a more cynical view from Jarrow:

Female X: They're keeping you quiet and give you money.
(Jarrow 2,2)

This highlights the extent to which in a situation of distrust the dilemmas of any course of action seem to proliferate. Thus, even where some local people expressed appreciation of the company's community involvement and intentions, their approval was sometimes mixed with the feeling that it was not really addressing their concerns about safety.

In contrast to these 'official' sources of information, employees and former employees living locally, particularly at the larger sites, were also an important 'unofficial' (but often trusted) channel for information about what goes on within the site. Some companies are very conscious of this link and try to use their employees as an active resource for reaching into the community. But it should be noted that the stories and views that these 'ambassadors' convey once they have clocked off do not always cast the company in a positive light.
5.3.5 The media

One source of information to which considerable importance is often attached in the literature on public perceptions of risk is the media. This is particularly so in discussions of the social amplification of risk perceptions. For some people the media were seen as being the only source of information about what happened at a site:

Female X: Oh, the only time that you’re gonna find out whether there is anything wrong or right or whatever...
Male X: Is when it blows up.
Female X: ...depends on a minor incident. The papers always find out about it so, you know, if ever there has been any cause it’ll have been in the papers. You know, because nothing, you know, even if it is only a [...] little fire or anything, if there’s nowt in the papers there’s obviously nothing gone wrong so it should be safe. (Brinsworth 6,1)

Even where the media were not mentioned in the focus groups as a primary source of information, as was frequently the case, it was clear from people’s knowledge of events following incidents, for example, that the media were an important source of information that fed into local networks. Whereas some sources of information were clearly identified, however, the media often appeared to be a relatively unreflected part of the cultural backdrop. On the other hand, those who felt impelled to defend their local company during the focus group discussions typically mentioned biased reporting by the local press. People connected with several of the companies complained of the uneven treatment received in the local press. However, a search of local newspaper archives often revealed relatively balanced coverage over the years, although, as one might expect, major incidents and local protests received prominent and often critical coverage. This suggests that the role of the media as an influence on local risk perceptions may be quite different at controversial sites — or, more specifically, at times of controversy — than at relatively ‘quiet’ sites, where even the occasional incident may soon disappear from the headlines.

In some cases local media coverage that is critical of the company, rightly or wrongly, may influence local perceptions of a company and its image in the community. We have noted the important economic role that Esso has played in the South Waterside area of Hampshire. However, the company also featured in a local television documentary in 1993, which suggested that air pollution from the site was the source of respiratory problems among local children. The company has tried to rebut the allegations but memories of the documentary are still active and people recounted its claims to us in the Fawley focus groups. Strong visual images seem to make television coverage more memorable and, in general, people did not tend to refer to local press coverage in the same way.

5.4 REASONING ABOUT RISK - ARGUMENTATIONAL REPERTOIRES

As we noted in Chapter 2, popular thinking about risk has often been characterised as being irrational. In our focus groups, however, we found that people reasoned about risk issues in complex and varied ways. In this section we outline the main argumentational repertoires

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3 The social amplification model is outlined and discussed by Renn et al (1992).
4 It was notable, for example, that the Albright and Wilson explosion ceased to be newsworthy in the local newspaper within two days of the incident. News reports relating to the Allied Colloids site, by contrast, continued to make references to the 1992 fire and other incidents for months, if not years, afterwards.
which people deployed when reasoning and arguing about the possible risks associated with the major hazard sites near which they live. As we noted in chapter 2, a failure to recognise the different and sometimes incommensurable frames employed in risk discourse can be the source of misunderstanding, frustration and even conflict. An awareness of the variety of argumentational repertoires and the way in which they are framed will therefore bring with it a better appreciation of public concerns and may contribute to enhanced communication between those responsible for risk management and their publics.

The argumentational repertoires available to individuals are quite heterogeneous and draw upon types of argument that are distributed among the populations around all of the sites that we studied. They may be combined in many different ways in the course of a discussion, moving seamlessly from one argumentational strategy to another. It is important to emphasise that these are *modes* of argumentation or argumentational *strategies* and may therefore be used to argue both ways; that is to play down or to emphasise a particular risk.

**5.4.1 Analogies and comparisons**

When talking about the risks associated with major hazard sites, people often reason by analogy with more familiar domains of experience. Analogies may be drawn from personal experience or that of others in their social network (for example, drawing on knowledge of workplace risks and practices), or even the 'mediated' experience of what are seen as relevant situations and events relayed by the mass media (for example, Chernobyl or BSE).

The use of analogies and stories is a very powerful form of reasoning, enabling people to speak with authority and conviction about a topic that in other ways may be remote from their experience. Analogies can be used to argue both ways, to exemplify a risk or to play down the hazard potential of their situation. The related use of risk comparisons was an argumentational device more often used in the attempt to play down the risks associated with the local site. Comparisons were made, for instance, to the risks on the road or of being involved in an air accident, although the use of such comparisons was often challenged and even rejected by other members of the group if it was considered illegitimate. In Jarrow, for example, an attempt to use the air crash analogy was dismissed as irrelevant with the argument that 'we're not talking about aeroplanes, we're talking about Jarrow'. We return to the use of such arguments in the discussion of policy issues in Chapter 7.

**5.4.2 Consequences**

For many people it is the *consequences* of an accident for the local community that was the criterion for deciding about risk, rather than the probability of it occurring. People often seemed to conceive of a major accident in terms of a 'big bang' and references to the possibility that a major accident at a site would take half (or the whole) of the area with it occurred regularly in the discussions. This was so even at sites where the major hazard was toxic in nature and where the potential for a major explosion simply did not exist.5

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5 In keeping with the purposes of this report, we have focused here on the perceived consequences of an accident but it is important to note that for many people living around the chemical production sites the primary everyday concern was about possible health effects arising from environmental pollution. Although people expressed considerable uncertainty about the nature or possible consequences of such chronic risks, they were a source of anxiety at all of the major sites.
It was also notable that the worst case scenarios envisaged by members of the lay public were frequently far worse than those projected on the basis of formal risk assessment, even at the quietest sites:

*Male: If anything happens, like at BOC, we're talking about like a major incident within a two mile radius, four mile radius.*
*(Brinsworth 6, 1)*

This would be worth bearing in mind when considering industry concerns about the wisdom of presenting worst case scenarios to the public. We return to these issues later in the report.

### 5.4.3 Probabilistic arguments

Although many people were concerned about the consequences of an accident, others used probabilistic reasoning to justify toleration of a site's presence, arguing that the odds of a serious accident occurring were very remote. However, as with other argumentational strategies, probability was used as an argument that could cut both ways. For example, the logic of arguments that point to the low probability of a serious accident occurring could be turned on its head with the counter argument that the one in a million accident could still occur at any time:

*Female 3: It only needs to happen once though doesn't it? It doesn't matter how, if there is or any risk whatsoever no matter how minimal it only needs to happen once and that's once too many.* *(Low Moor 3,2)*

This view was perhaps reinforced in popular consciousness by the evidence, despite odds of 14 million to one, of weekly National Lottery winners and the catchy slogan “it could be you”.

Some people remain obdurate in the face of arguments that the probability of a serious accident occurring at a major hazard site is very low, countering it with the argument that if something can go wrong with a hazardous technology, it probably will.

*Female X: but how could anyone build that and say oh it's going to be fine, nothing's ever going to happen, 'cos something always happens, whether it's big or little, I don't care what anyone says.* *(Jarrow 2,2)*

The argument may be criticised as unfounded pessimism but bears a striking resemblance to what sociologist Charles Perrow has referred to as the problem of 'normal accidents'. Perrow argues that in complex, 'tightly coupled' technological systems it is the characteristics of the total socio-technical system rather than simply 'human factors' that make accidents more likely.

We can see from these examples how the 'common sense' reasoning of members of the lay public when considering the risks associated with major hazard sites may lead to conclusions quite different from those of risk management experts who employ probabilistic analysis to assess the situation. As we noted in chapter 2, we cannot reduce these differences to a simple distinction between objective ('correct') and subjective ('incorrect') judgements but have to recognise the different ways in which each party frames the problem.
5.4.4 Moral arguments

Perhaps the sharpest contrast to technical ‘expert’ framing can be found in the public’s moralisation of the issue. Moral arguments that people simply should not be exposed to the risk of harm from major hazard sites were made in most of the focus groups during. In discussions about the local site these moral arguments were often expressed in terms of the unfairness and inequity of exposing a particular community to the dangers of a hazardous site, particularly where its members were not perceived to be beneficiaries of the site’s activities.

A similar moral framing of the issue found expression during discussions of the planning scenarios (which are discussed in detail in Chapter 7) in what we have characterised as ‘utopian’ arguments. These were usually prefixed by formulations such as ‘In an ideal world...’. However, by the very act of framing their argument in this way people were already signalling that it would not be defensible in the face of what were perceived to be the ‘political realities’ of actual decision making situations. This sense of disparity between personal morality and ‘official’ practice served to highlight the perceived gulf between the values and concerns of ordinary citizens and those of the various authorities and policy actors. In its more extreme form, voiced particularly in some of the unemployed groups, this sense of disparity took the form of a profound resentment and cynicism about ‘the way the world really works’ and viewing business, government and regulators as being implicated in a web of self-interest, complicity and corruption.

Against those who argued that the plant should be located elsewhere, some took an anti-NIMBY line and pointed out that moving the plant simply would simply put some other community at risk:

Female X: If you’re talking like that it’s just a case of saying Not in my back yard isn’t it. There’s, they’re bound, it’s bound to be near somebody. There’s very very few remote places these days isn’t there that’s near enough for people to want to work there. (Low Moor 3,2)

This argument came up during the scenario discussions but also during the first round of meetings which discussed the local sites. As well as a certain pragmatism, the anti-NIMBY argument also implies the possibility of toleration based on a sense of moral responsibility to a wider community, one beyond their own locality, although in practice this argument was not made by many people and was not developed. Both of the next two types of argument - based on economic trade-offs and individual choice - also address this question of local toleration of the sites.

5.4.5 Trade-offs

There is no doubt that some people perceived there to be economic or other benefits to their own area from the presence of the local major hazard site; however, the weight accorded to those benefits when considered as trade-offs against possible risks varied considerably. Even in Low Moor and Fawley where there were significant employment benefits, opinion over the company’s presence was divided, suggesting that even where the benefits are acknowledged many people find the notion of weighing economic benefits against risk to public safety to be extremely problematic.

There were for example those who saw the promise of employment as a means by which firms
could manipulate local authorities to sanction developments and, by implication, hold communities to ransom, particularly where a company was a major local employer. Even where they were accepted, trade-offs between economic benefits and risks were usually seen as a constrained necessity, but definitely not as an excuse for companies to lower their safety standards or for regulators to lessen their vigilance.

In several of the case study areas most people denied that the local community enjoyed any significant benefits from the presence of the site - this was particularly the case in Jarrow and Llandudno. For example, several people at Llandudno pointed out that the LPG stored at the site was for use in rural areas not in the town itself, which had a mains supply of gas. Only in Low Moor, which also had one of the highest levels of local people employed at the site, did we find significant levels of concern expressed about negative economic impacts. In this particular case they were associated with depressed property values as a result of the perceived stigma effects mentioned earlier. Here there was a perception that the consequent economic benefits and disbenefits were unevenly distributed between company workers and those unconnected with its operations. There were also occasional references to that fact that employees were being compensated by high levels of pay for their exposure to the hazards associated with the site but that local people received no such compensation.

Female X: So any chemical works that's the risk sort of that you take and I suppose in your salary you'll get compensated for that wouldn't you.
Female X: I think they do pay well.
Female X: Yeah. But if they're getting compensated for working there 'cos they're breathing stuff in well we're not getting nowt and we're you know we're living with it. So if they're getting compensation it's obvious that they're breathing in summat that they shouldn't be (Low Moor 3,1)

In contrast, at some of the non-chemical sites there was more recognition of the practical, rather than simply direct economic, benefits derived by local people from the site's operation. A clean drinking water supply at Frankley, for example, or oxygen for the local steel industry at Brinsworth. There was not, however, much discussion of the wider societal benefits that accrued from the operation of any of these major hazard sites. Benefits, like risks, tended to be seen very much in local terms.

5.4.6 Choice

This argument about the difference between the situation of those local people who worked at a site and those who did not was also linked to the issue of choice. It was argued, for example, that employees chose to work at the site, whereas local people did not choose for it to be on their doorsteps. This question of individual choice was an important theme in many of the discussions. Against some of the more critical social and moral arguments, some participants - more often owner-occupiers - maintained that people have a choice where they live and that in making that choice they had accepted the risks presented by the local site.

Female X: you know. Er I think like, say if you get tempted with a new house yeah it the temptation's there but if you were so adamant you didn't want to be near it you would say no so...I mean they're not it's not saying they're homeless people, you know you're not saying Oh they've got nowhere to live at the moment. You, you're saying that there's a

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6 One Brinsworth resident, who suffered from very acute asthma, made a direct connection with his own personal needs and noted the essential medical uses of the oxygen supplied by the company.
local housing shortage so... It's a different thing if they're homeless I suppose [laughs] but even then I mean I do think you do to a point have a choice.

(Low Moor 3,2)

However, against this it was also pointed out that many people have very little knowledge of these sites when moving into the area and that it is only after living in the area for a time that they learn of the hazards that are present. (We return to the issue of information provision in Chapter 7). Participants - particularly those in social housing - frequently pointed out during the discussions that freedom of choice is heavily dependent on economic circumstances. Where owner-occupiers made their housing choices on the open market, those in social housing had their housing allocated to them and refusal of a particular offer often meant a long wait for an alternative or even removal from the waiting list. Some participants took this line of reasoning further and argued that people need to be protected from 'choices' which are not in their own best interests but which they would be hard pressed to refuse.

5.4.7 Habituation

In contrast to arguments based on trade-offs and individual choice, in many areas we more often encountered a habituated acceptance of the local major hazard site and the associated risks, accepting its presence as part of everyday life.

Female 2: But really it's not something you prioritise in your life is it finding
Female 3: No.
Female 2: out what Allied Colloids do
Female 3: No.
Female 2: today you know.
Moderator: Right.
Female 3: Life
Female 2: That's right I mean
Female 3: just goes on doesn't it?
Female 2: if you've lived here for ages
Female 3: you get used to it don't you.
Female 2: yeah for years it's just there it's just something
Female 3: Yeah.
Female 2: that you feel you've got to accept or
Female 3: Mm.
Female 2: I have done.
(Low Moor 3,2)

On occasion, again usually in areas with major chemical production sites, this habituated view was associated with criticisms of incomers who moved into the area and then complained about the chemical industry. This was based on a mix of several of the arguments already identified, including a strong sense of local identity, a recognition of the economic trade-offs and the argument that people should not complain because they had made an informed choice. This criticism was voiced strongly by Low Moor residents with family links to the industry and to a lesser extent by some of the older Langley residents. It highlights the extent to which mobility in the local population can have implications for local toleration of the risks associated with major hazard sites. It was significant that in areas where there had been local activism and pressure on the site management, it had often been instigated by people who had fairly recently moved to the area. This was, for example, the origin of the Albright and Wilson community liaison committee.
In line with the argument put forward by Wiegman, Gutteling and Boer (1991), which was reviewed in chapter 2, one might attribute the 'habituated' response to 'social learning'. In other words that, as a result of their day-to-day experience of living with the site, long-term residents 'learn' that the site is not a threat. There is no doubt that some of the focus group participants, particularly at low profile sites with no accident history such as Brinsworth and Frankley, did not perceive the site as presenting a significant risk to local people. However, well-established residents in some of the case study areas also repeated many of the more critical arguments that we have already outlined. So familiarity is not in itself enough to guarantee a tolerant attitude towards a major hazard site. Other people who expressed habituated responses seemed to be more inclined to tolerate a high profile major hazard site because they made a positive connection between the site and the history and identity of the locality and its people. As we noted earlier, for example, some of the lifetime residents of Langley associated Albright and Wilson with the identity of the locality and several had stories about the site that dated back to their childhood or had been told to them by fathers and grandfathers who had worked there.

During the commissioning of this project, concern was expressed about the difficulties of informing (and, implicitly, motivating) what was described as the 'apathetic majority'. This characterisation was one that, in one form or another, we have encountered in our contacts with a variety of individuals in both the regulatory and business communities. The notion that the perceived lack of interest in information about the risks associated with major hazard sites, or in emergency planning measures where these are publicised under the requirements of the CIMAH Regulations, is attributable to public apathy seems to have relatively widespread currency. But before we accept this appearance of 'apathy' we should take pause for thought and subject the use of this term to careful examination in the light of the evidence of our discussions with members of the public. Of all the points of view expressed in the argumentational repertoire outlined in this section, it is the habituated point of view that might most closely resemble something that could be described as 'apathy'. 'Apathy' implies literally that someone has no feelings about or is indifferent towards something. However, to make a rather obvious point, when discussing the 'problem' of apathy we must first be sure that a perception of hazard exists. It would be nonsensical to consider someone to be 'apathetic' towards a risk that they did not know to exist. Where such a perception of risk does not exist, members of the local public may indeed be indifferent to the presence of a hazardous site. The suggestion that people are indifferent to nearby industrial sites that they perceive to be hazardous is not supported by the evidence of the group discussions. There is certainly evidence that some participants held a fatalistic attitude towards the risks associated with major hazard sites but this may be accounted for in terms of a perceived lack of power to do anything about it.

The different arguments and modes of argumentation outlined in this last section indicate some of the possible bases for toleration - and for a lack of toleration. We will not pursue them further here but will return to the question of toleration and tolerability more fully in the following chapters.

5.5 A NOTE ON EMOTIONS

In the previous section we have considered the different arguments and problem frames that people employ when reasoning about risk. What this description does not communicate, however, is that emotion too plays an important part in these processes. References to emotion in the context of elite discussions of public responses to risk are often quite derogatory and make use of terms like 'emotional' and 'irrational'. In order to establish the conditions for mutual understanding and communication, it is important to recognise, as we argued in chapter
2, that it is not simply a question of emotions ‘distorting’ people’s perceptions. Rather, emotion is an intrinsic dimension of both cognition and reasoning and that people’s affective responses play an important part in helping people to pick their way through a complex and uncertain world.

One of the more vivid but difficult to communicate aspects of many of the groups which met was the feeling that these issues aroused. It was not simply that there was heated discussion during the meetings, although at times there was, but that more deep-seated feelings of worry, resentment and anger also came through - along with occasional expressions of loyalty to the companies concerned.

During the focus groups the one emotion that was rarely voiced in an explicit and open way, however, was anxiety or fear. Yet on occasions, such as when the notion of fatal consequences was introduced during the planning scenario discussions or when people discussed their reactions to particular events or phenomena (such as accidents or sirens sounding), one could detect a clear sense of unease. In fact it was notable that when talking about highly emotional situations such as the Allied Colloids fire or the Albright and Wilson explosion people would often use laughter as a way of managing the discussion of the topic. At other times some speakers were willing to be quite explicit about their concerns - often triggered or revived by recent accident events. These feelings came through much more clearly in some of the Q-sorts, leading us to reflect on the tacit rules that dictate which emotions it is socially acceptable to display in which situations. It is often socially unacceptable to admit to anxiety or fear in certain public situations - but people may have felt freer to do so when completing the sorting exercise in private. We need to be conscious of the ways in which social codes constrain communication and in which the semi-public nature of the focus group, or of other discursive arenas, may inhibit discussion of more sensitive topics.

5.6 CONCLUDING REMARKS: TRUST, AGENCY AND RISK PERCEPTIONS

As we observed at the outset of this chapter, two critical and often closely interrelated influences on perceptions of major hazard risks are the sense of individual or collective agency and the degree of trust or distrust in the institutions responsible for managing those risks.

We frequently (but not exclusively) found that a high level of distrust was associated a sense of powerlessness, or lack of agency. A sense of personal agency in relation to political and administrative institutions and processes was least evident among the unemployed and poorer working class groups in areas such as Jarrow and Frankley. These groups were often the most cynical and resentful when discussing the role of government and business in ensuring their safety and frequently drew on their experiences of these institutions in other areas of their lives. As we have noted, they typically depicted a world of complicity and corruption, where private rather than public interest dictated decisions.

Middle class participants, on the other hand, were very often more willing to accept the competence of technical experts and managers to carry out their day-to-day tasks in a responsible and professional manner. At the same time, however, they were far more likely to feel themselves to be in a position to challenge the authority of such institutions if the need arose. In fact, in cases of controversy middle class residents often instigate public opposition to hazardous sites. So a sense of agency certainly does not eliminate the perception of risk or ensure its toleration. Conversely, those who appear most concerned and least tolerant may rarely, if ever, voice those concerns in the public arena if they lack a sense of personal agency and a sense that their concerns would be listened to or acted upon.
Only a minority of people made what appeared to be an emphatic declaration of trust in the company operating the local site and professed themselves not to be worried at all by its presence, maintaining that the site was 'safe enough'. It was notable that at Low Moor and Fawley this view was most strongly associated with those who had employment links with the industry. Familiarity was not necessarily enough to ensure trust, however, and several of the ex-employees we spoke to at Fawley drew on their knowledge of working practices to justify a much more distrustful view of safety management at the site.

To conclude, the results from our focus groups accord with previous research, referred to in Chapter 2, which has emphasised the ways in which trust and agency are related to the perception or toleration of risk. We return to these issues of agency and trust, and in particular their relationship to public toleration of major hazard sites, in our analysis of the Q-sort data that follows in Chapter 6.
6. PUBLIC PERCEPTIONS AND ATTITUDES: Q-METHOD DATA

Earlier, in Chapter 3 where the procedures of Q-method were described, we explained that the factors to emerge from the analysis of the Q-sorts represent distinct points of view. It is important to bear in mind, therefore, that what we describe in this chapter are different points of view and not particular types of individuals. The points of view described represent underlying patterns or 'ideal types' that are shared to a greater or lesser extent by a number of people, although the views of those individuals will not coincide in every respect.

6.1 INTERPRETING THE Q-SORT DATA

As we noted in Chapter 3, the main factors - each representing a different point of view - for each case study site were assembled together and subjected to a 'second order' or 'meta' factor analysis to explore any underlying patterns and identify any notable differences that occurred across the different sites.

When analysing the results of the meta-analysis of all case study data we focused on those factors that were shared by two or more people, whether or not at the same site. While it is important to recognise the validity of viewpoints that may be idiosyncratic to particular individuals, we have described only those points of view that were identified significantly with more than one individual. Adopting that criterion the meta-factor analysis revealed six underlying points of view in the Q-sort data. In the following section we describe the points of view that these represent and also examine notable differences in their formulation or occurrence between case study sites. The occurrence of the six factors across the different sites is set out in the following table.

<table>
<thead>
<tr>
<th>Case study site</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
<th>Factor 4</th>
<th>Factor 5</th>
<th>Factor 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Langley</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Low Moor</td>
<td>X</td>
<td>X1</td>
<td>X2</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jarrow</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Fawley</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Brinsworth</td>
<td>X</td>
<td>X/X1/X2</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Llandudno</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Frankley</td>
<td>X</td>
<td>X/X1/X2</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A subscript letter accompanying an entry indicates that at a particular site there was a variant form of the factor. These variations are discussed below.

6.2 POINTS OF VIEW IDENTIFIED FROM THE Q-SORT DATA

In order to characterise the point of view represented by each of these six factors we have presented each one as a narrative depiction or vignette (shown as boxed text). As we explained in Chapter 3, these do not represent the views of particular individuals but are 'ideal types' that capture the main patterns underlying the different views which people express in the Q sorts. These vignettes are constructed by taking those statements positioned to either end of the synthetic Q-sort for the factor (in the range +/-2 to +/-4), which indicate clear agreement or disagreement, and linking them together to produce a narrative that captures the point of view expressed.
6.2.1 Factor 1 – Lack of toleration based on vulnerability, powerlessness and distrust

Box 1: Lack of toleration based on vulnerability, powerlessness and distrust

I am very worried about the site - and so are a lot of other people around here. I worry that there are risks at the site we know nothing about and about the effects of pollution from the site - I'm sure that it must be having some harmful effect on our health. If there was a serious accident at the site the results would be catastrophic - it would probably take half the neighbourhood with it - and accidents like that do happen. It isn't safe around here. I feel very vulnerable but powerless to do anything about it - the risk is just imposed on us. The company certainly can't be trusted. You can't believe what they tell you and at the end of the day they will always put profits before the safety of local people. I'm not even sure they know what they're doing. There's no way that you can say that the economic benefits they bring outweigh the risks. At the same time we can't rely on the regulatory authorities, emergency services or the experts to protect us.

This point of view seems to capture many of the elements identified as amplifying influences on public perceptions of risk: unknown dangers, imposed risk, distrust in risk managers, personal and high consequence effects envisaged. The strongest aspects are the sense of concern about the risks associated with the local major hazard site - it is notable that this includes both the risk of a ‘big bang’ and possible pollution risks - and the sense of distrust in the company. There is also a sense of alienation from and lack of confidence in the authorities responsible for public protection. The message is unequivocally intolerant and this factor stands out from all the rest, which represent varying degrees of and reasons for toleration.

The first thing that stands out is that this ‘intolerant’ point of view is the only one to be represented at all sites. It is also the factor which had the most individual Q sorts associated with it as ‘defining’ sorts - at least five times as many as any of the other factors. It was by far the strongest factor at several sites, the exceptions being: Fawley, where it had more or less equal standing with Factor 3 (‘trusting the company’); Frankley, where variants of Factor 3 far outweighed Factor 1; and Brinsworth, where a specific local variant of Factor 2 took equal place. We discuss these exceptions below.

Two minor variations in the configuration of Factor 1 highlight the importance of local context. The first is that at Low Moor and Jarrow considerable emphasis was given to the statement that ‘having the company round here gives the area a bad name’. This was strongest at Low Moor where the 1992 fire has left an impact on public perceptions of the area, which is also associated with pungent odours from the site. At Jarrow it seems to have been related to earlier public controversy over the problem of odours from the site. The second variation was that at sites where there is an odour problem clear concern about the health effects of the smell from the site is always registered in Factor 1.

As we have seen, Factor 1 represents a point of view characterised by strong concern or even anxiety about risks associated with the local site, by distrust in industry and public authorities, and by a sense of powerlessness. That this appears to be such a widespread viewpoint in relation to major accident hazard sites poses a challenge both to risk communication and to the public consultation processes to be introduced under the COMAH Directive, a point to which we shall return in the concluding chapter.
6.2.3 Factor 2 - Toleration based on habituation

The company is just part of everyday life here and it's not something I worry about, nor do most other people around here. It certainly doesn't affect the way people see the area - it's as safe a place as anywhere else. People who worry about chemical hazards tend to have exaggerated fears. Certainly accidents will happen - chemicals can never be 100% safe - but there are more dangers from everyday life than there are from the local site. It's wrong to see the industry just as a threat. The people at the company know what they are doing and are concerned about safety. That's where I would go for information about safety - they wouldn't just give you a load of PR. However, they are also profit motivated; people cut corners and will put profits before safety. I don't really know what I would do if there were an accident and don't think that the emergency services could do much to help us.

The overwhelming impression conveyed by this factor is that the site is just there - part of the locality. We find a sense of habituation to whatever risks there may be in the argument that the site is just a part of everyday life in the area. There also appears to be a degree of confidence in the technical competence of the site operators but at the same time a certain 'realism' about commercial priorities taking precedence over safety concerns. The authorities - regulators and emergency services - do not really figure in this account at all. On the other hand, there is no sense of personal empowerment either to protect or to change the situation. So along with habituation there is also a sense of resignation or fatalism to being exposed to danger.

In both of its variants this point of view is unchanged in respect of the sense of habituation already described. Where the first variant - found at Brinsworth, Llandudno and Low Moor - differs significantly is that it also expresses considerable confidence in the competence of the company and in expert judgements of risk. There is also more emphasis on the ability of the public to make their own judgements about risk and on individuals having the choice to move out if they don’t like it. This point of view conveys a sense of there being a much more confident basis for living with the risks associated with the site.

Brinsworth also threw up a second variant of the 'habituated' point of view that was as widely expressed in the Qsorts as the ubiquitous, 'intolerant' Factor 1 view described above. The main difference here was that it lacked the sense of risk or vulnerability that was the counterpoint to the otherwise robustly habituated view characterised by Factor 2. The overwhelming impression that this variant gives is that there is nothing to worry about, with no emphasis given to the possible risks associated with the site. There is no great sense of identification with or support for the company but neither is there any particular sense of vulnerability or powerlessness. This fits with the relatively low profile and transparent nature of the BOC operation. Many people in the Brinsworth area were familiar with the industrial and medical uses of its products and did not perceive the site as being particularly hazardous. Neither was it generally associated with perceived environmental or health threats in the same way as the chemical production sites.

We can underline the importance of local context for this perception of minimal risk by posing the counterfactual question of what differences we might expect under different circumstances. At Brinsworth, unlike the LP Gas site at Llandudno, there has been no previous history of CIMA.H information, emergency siren testing, checking by the security services during major political conferences in the town, or planning disputes highlighting its proximity to a primary
school to sensitise local concern. It is arguable that had some of these conditions obtained, or had there been a previous accident such as the one that occurred at BOC’s Morden site at the very time we were conducting the Brinsworth interviews, then the picture might be very different.

As Table 6.1 shows, the points of view represented by next two factors, Factor 3 (‘trust in the company’) and Factor 4 (‘trade-offs’), both occur as distinct factors at the same four sites. As we shall see, in both cases this is largely attributable to the economic and employment links that the site has to its locality.

6.2.2 Factor 3 - Toleration based on trust in the company

<table>
<thead>
<tr>
<th>Box 3 - Toleration based on trust in the company</th>
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</thead>
<tbody>
<tr>
<td>In general the industry is responsible and committed to safety. Its products are essential to modern life and although the chemicals they use can never be completely safe we have to accept that there will be some risk. Accidents will happen sometimes but as technology develops the risks are reducing all the time. This may not be the safest place to live but the emergency services are there to protect us if anything ever happened. Personally I wouldn’t know how to protect myself in the event of an accident but if the experts say that it is safe enough that’s good enough for me. The public aren’t capable of making judgements about these things so we have to rely on the company. The people at the company are competent and responsive to local concerns. You can’t rely on the media for accurate information - if you want to know anything about safety the best place to go is the company.</td>
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</table>

Where Factor 1 was characterised by a profound distrust of the company, here we have the reverse. On the basis of the statement rankings, the strongest emphasis in this factor is, on the one hand, the argument that both the company and the industry more generally are responsible and safety conscious. On the other hand, at Langley and Frankley at least, there is an emphatic sense of not knowing how to protect oneself in the case of a serious accident. So we have a clear sense of vulnerability allied to a strong declaration of trust.

Let us now look at the ‘variants’ – found at Low Moor, Fawley and Frankley – on the ‘trust in the company’ viewpoint represented by Factor 3.

At Low Moor Factor 3, which was particularly associated with participants who had family links to the chemical industry, displayed a couple of notable differences to other sites. First there was an emphasis on the role of the HSE in ensuring that the plant was safe. This is significant in the light of the high level of local awareness of the HSE’s investigation into the 1992 fire at Allied Colloids and of the HSE report. Second, there is an acknowledgement of stigma in the emphasis given to the statement that the presence of the company gives the area a bad name, which, as noted above, is also one of the characteristics of the ‘intolerant’ Factor 1 at Low Moor.

We have already noted that at Fawley Factor 1 (worried, distrustful, etc.) was balanced by an equally strong Factor 3. Fawley was different to all of the other case studies in that a number of employees and ex-employees from the refinery complex who were local residents participated in the research. Although Fawley was the only area where employees and ex-employees of the major hazard site were represented to such an extent, this also reflects the fact that they constitute a significant element of the local population in the villages around the
refinery complex.

When we examined the results of the meta-analysis we found a very strong factor for Fawley which did not correspond directly with any of the factors identified. On closer scrutiny we found that this point of view was associated almost exclusively with some current or former employees (although certainly not all) of one of the companies in the Fawley complex. The one exception was a member of the local community who had a beneficial professional involvement with one of the companies at the complex. This Fawley variation bears a fairly close resemblance to the sentiments of Factor 3 at other sites but it differs in some notable respects. First, there is a very strong emphasis on individual choice, as one might expect from workers who have chosen to live and work in the area. Second, there is an emphasis on the economic benefits of the presence of the refinery complex, again reflecting both the fact that most of the people with whom the point of view is associated have worked there and also that the complex dominates the local economy. Third, there is a clear sense of being able to take protective action in the event of an accident, again as one would expect from people with a working knowledge of the hazards. Finally, there was some acknowledgement of the potential for a major, even catastrophic, accident at the site, a view which was absent from the more general version of Factor 3 but which perhaps reflects an insider’s view of the hazards.

At Frankley we find the Factor 3 viewpoint as described but we also find a much stronger variant of the pro-company view, which gives particular emphasis to the statement that ‘clean water is essential...so we have to put up with the risks’. In fact, taking these two variants together, the point of view represented by Factor 3 is by far the strongest at Frankley. The strength of this trusting point of view clearly reflects the nature of the product with which the site is associated - one only has to make the contrast with the same statement about chemicals used at several other sites to see the difference. It may also be relevant that, as we found in the group discussions, the main focus of distrust and resentment is the local authority and that by comparison many residents saw Severn Trent as being far more responsive to local concerns. The other notable difference is the strongest possible disagreement with the statement that ‘having Severn Trent around here gives the area bad name’. As we noted in Chapter 4, the local council estate is stigmatised for its social problems not for the presence of a major hazard site. If anything the presence of the Severn Trent site is seen by some as a mitigating factor because it ensures the maintenance of the green belt bordering the estate.

6.2.4 Factor 4 - Tolerance based on trade-offs and agency

<table>
<thead>
<tr>
<th>Box 4 - Tolerance based on trade-offs and collective agency</th>
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<tbody>
<tr>
<td>The company makes an important economic contribution to the area and there are probably more dangerous things in everyday life but I still worry about what gets out of the site into the local environment. The company is the most reliable source of information about safety but we are not being told about all the risks. With the chemicals they use, accidents are to be expected - and it's ridiculous to say that there's not much chance of one happening at the site - major accidents can happen. But we absolutely can't rely on the regulatory authorities or the experts to protect us. Personally I would definitely know what to do to protect myself if here was an accident. It's not that everyone round here worries about the site but it would be wrong to dismiss any concerns that people might have as being exaggerated. People are quite capable of making their own judgements about the risks and if we were concerned enough to make a fuss, someone would have to do something about it.</td>
</tr>
</tbody>
</table>
This factor is the only one, apart from the variant of Factor 3 associated with the Fawley employees, that emphasises the importance of economic trade-offs. It is significant therefore that three of the sites with which it is associated - Langley, Low Moor and Fawley - are a major economic presence in their respective localities. The exception is Frankley where the make up of the factor is slightly different and does not emphasise economic benefits in the same way, as we might expect given the relatively low level of employment at the site. We can nevertheless explain the occurrence of the trade-off argument at Frankley in terms of the benefits of the clean water supplied by the water treatment works, which, in contrast to the benefits of chemical products, was widely acknowledged in the focus group discussions. In comparison to the other points of view, however, the sense of toleration in Factor 4 is also based very strongly on people’s perceived capacity to protect themselves, to make up their own minds about the risks and to induce change if they felt sufficiently concerned. There are indications of distrust in the emphasis given to the statement that people are kept in the dark about the risks associated with the site. There also appears to be an explicit lack of confidence in the regulatory authorities or the knowledge of experts to ensure public protection.

6.2.5 Factor 5 - Toleration based on faith in the authorities

Factor 5 - Toleration based on faith in the authorities

The people at the company know what they are doing and both the company and the industry in general are committed safety. In any case, the risks are reducing as technology progresses. In general this is as safe a place to live as any. However, accidents will happen and could happen at the local site. And if the big one happened it would have a catastrophic effect on the area. It’s a worry for a lot of local people and I don’t know what I could do to protect myself if anything did happen. They say that what they produce is essential to everyday life but that’s no reason why we should have to put up with the risks. There is no way that the site brings economic benefits to the area that outweigh the risks. We are perfectly capable of making our own judgements about the risks but we don’t have any choice about being in this situation. I suppose you could say that this area is as safe as anywhere else is but a lot of people worry about an accident happening and I’m concerned about what gets out of the place into the local environment. Still, the authorities and experts are there to keep an eye on things and, most importantly, we can rely on the HSE to make sure that the place is run safely.

Here we find clear concern about possible risks associated with the site, generalised to other members of the local population, and the implication that the site has the potential for a catastrophic accident. Allied to this is the sense of being subject to an imposed risk. However, there is trust in the various authorities and experts. If we turn to the strongest and most distinctive characteristics of this factor we find a rejection of trade-off arguments balanced by a very emphatic declaration of confidence in the HSE as guarantor of their safety. Although during the focus groups statements of confidence in the authorities, and particularly the HSE, were expressed by some participants at all of the sites, this is only a defining characteristic of Factor 5. As we saw from the table earlier in the chapter, Factor 5 is only found at four sites - Brinsworth, Frankley, Jarrow and Llandudno. Interestingly these are the lower profile sites that have no recent history of major incidents (or of accompanying HSE investigations and enforcement actions), so the lack of any hazardous events may well have been taken as evidence that the authorities were doing their jobs effectively. At the other sites, in contrast, local people had observed incidents of varying scales and may have been less inclined to conclude that the HSE was able to ensure accident-free operations at the site.
626 Factor 6  Tolerance based on individual agency and choice

Factor 6 - Tolerance based on individual agency and choice

As far as I am concerned this area is as safe as anywhere - there are probably more dangers in everyday life than there are from the local site - people's worries are often exaggerated. Mind you, accidents will happen when you're using dangerous chemicals or gases, and if a really big one happened at the site it would be pretty catastrophic - but I'd know how to take care of myself. We need what they produce so I suppose that we have to put up with some risk. It would be ridiculous to describe the industry as just a profit-motivated threat to public safety but they are not exactly committed to protecting the public either. They don't tell you what's going on - the media is the only way we find out anything. At the end of the day I don't really think that we can rely on anyone in authority - industry, experts, the council and least of all the HSE - to protect us. No-one's going to do much about any dangers from the site - even if local people make a fuss about it. But people are not fools - we're perfectly capable of making our own judgements about the risks associated with major hazard sites and individuals can make their own choice - if they are that worried they can always move out.

Here we find a very strong sense that 'accidents will happen' but one that is put into perspective - in that there perceived to be risks wherever you live, making this particular area no more dangerous than many others. As we can see, there is a fairly measured view of the industry but no confidence at all in the authorities to ensure public safety. There appears to be much less concern about living with the risks than we find in Factor 4, to which it bears some similarities. Whereas Factor 4 placed an emphasis on the economic benefits to the community as well as on the power of local people to influence events, Factor 6 presents a much more individualistic point of view. We have an impression of a self-reliant individual, able to take protective action in the event of an emergency and placing a very strong emphasis on people's ability to make their own judgements about risk and on the exercise of individual choice.

Unlike some of the other factors it is not possible to account for the distribution of this factor according to the characteristics of the sites where it occurs. But given the point of view that it expresses, this is perhaps to be expected because it is the individualistic nature of the perspective that is its defining feature, rather than anything related to a specific local context.

6.3 CONCLUDING REMARKS

Referring back to Chapter 5, we can see a correspondence between the points of view captured by the Q-analysis and the themes and arguments that emerged from the focus group data. What the Q-analysis has done is to present those points of view in a series of snapshots that enable us to highlight some of the crosscutting similarities and notable differences in points of view at the different case study sites. It has endorsed conclusions reached on the basis of the background research and the focus group discussions at each site.

What the Q-analysis has also enabled us to do is make some general observations about the basis of local tolerance and intolerance of the risk presented by major hazard sites. The first observation is that intolerance of the presence of the major hazard site - characterised by a combination of distrust, perceived vulnerability and a feeling of powerlessness to affect the situation - is by far the strongest and most widespread of all the points of view that we encountered. This confirms the impression formed in the course of conducting the focus groups.
at successive sites. The second observation to be made is that views expressing tolerance are far more differentiated and founded on a variety of different factors.

Taken together, these observations suggest that intolerance is likely to be relatively stable - that is, more difficult to change - because it is based on a cluster of strong, mutually reinforcing sentiments. Toleration, on the other hand, may be less stable where it is premised on a particular condition. We can illustrate this by looking at Factor 4, where toleration is based primarily on economic trade-offs. As we noted in Chapter 5, where there is a perception that the local economic benefits deriving from the presence of a major production site are being reduced, the goodwill of those whose toleration is based on the existence of such trade-offs is likely to become more attenuated. This might occur, for example, where industrial restructuring has led to a reduction in the proportion of local people employed at a site. To take another example, for those whose toleration is based on trust in the authorities as guarantors of safety (Factor 5), a sense that the authorities are not up to the job - perhaps as the result of a badly handled incident - is likely to lead to a reduction in toleration.

This inherent instability of some bases of toleration is counter-balanced by the 'pro-company' view characterised by Factor 3, which is based on a high degree of trust in the company as a risk manager and as a source of information. Where this view is based on both a working knowledge of and a sense of loyalty towards the company it is likely to be fairly robust in the face of an incident. However, at sites such as Frankley, where this trust has been founded on a positive company image and the absence of any threatening incidents, it is likely to be more susceptible to change in the event of a deterioration in company image or an incident that undermines public confidence.

One relatively stable basis for toleration is likely to be the widespread 'habituated' stance towards the presence of a major hazard site (represented by Factor 2), which does not seem to be based on any single guarantor. In its various manifestations we find elements of pragmatism, stoicism or even fatalism, which are all outlooks resistant to sudden change. So the habituated viewpoint may serve to provide a stabilising source of public toleration at times when toleration is strained by sudden events or changing circumstances. As we noted in chapter 5, this habituated toleration is perhaps the form that is most likely to be construed as 'apathy' but rather than indifference or a lack of concern we find a stance characterised by pragmatic everyday coping and by getting on with life.

In conclusion, it is important to remember that these points of view represent different 'voices', that is different lines of argument about major hazard sites that are in circulation in a given locality. If this diversity did not exist we might expect to reach very different conclusions. If, for example, intolerance were the only voice to be heard, we might expect public concern to erupt constantly into activism. Conversely, if habituation were to be the only public voice there might well be cause for concern at the public's apparent docility in the face of major hazards to its safety. What this and the preceding chapter have illustrated, however, is that neither is the case. Instead we have multiple voices expressing different points of view formed in dialogue, whether explicitly or implicitly, with one another.

In Chapter 5 we identified many ways in which different contextual factors shaped public views of major hazard sites and the varied repertoires of argumentation that are deployed within those local contexts. Then in this chapter we have identified some of the ways in which context and argument combine to produce patterns that, subject to local variation, recur across different contexts. We framed our discussion in this chapter in terms of toleration of risk but we might just as effectively have considered them in terms of trust and people's sense of agency, which pervaded our analysis of the q-method data as they did with the focus group.
data in Chapter 5. In Chapter 8 we return to these issues and consider their implications for aspects of policy and practice, including risk communication and the tolerability of risk framework. First of all, however, in Chapter 7 we examine the views expressed by our participants on the policy issues that were discussed in the focus groups.
7. POLICY ISSUES FROM FOCUS GROUP DATA

7.1 INTRODUCTION

This chapter provides a further analysis and discussion of the focus group data. It addresses participants’ attitudes towards and responses to a series of policy issues addressed largely in the second round of focus group sessions.

The second of the two meetings of each focus group specifically directed participants to the discussion of normative policy matters - what they felt ‘ought to be’ - through the use of a series of statement prompts and land use planning scenarios. In the first group, people also often reflected upon broader and more normative questions in the light of their experience of the particular local site. For these reasons the discussion in this chapter draws on material from both rounds of the focus group sessions. As will be seen, the range of argumentational repertoires that we discussed in chapter 5 permeate the focus group discussions of policy issues. In addition, a striking feature of our attempts to direct discussion in the groups away from the specifics of the local situation and towards more general, and, in the case of the scenarios, hypothetical issues, was the consistency with which the group participants in turn attempted to recontextualise their discussion by relating the general and hypothetical to their own local situation. This, as much as other evidence we have presented, clearly demonstrates the importance of context in the construction of public perceptions of risk.

7.2 FORMAL RISK COMMUNICATION AND INFORMATION RIGHTS

Female 2: I mean they say ignorance is bliss don’t they but it’s not always is it.
Male 5: Ignorance is frightening. Ignorance is frightening.
Female 3: Ignorance can be deadly.
Langley 6 (2)

Questions of public information rights and risk communication have become major issues for the management of major accident hazards since the implementation of the CIMAH regulations. These issues were specifically explored in the second round of focus groups through the use of the two statements shown in Table 7.1. The two statements were used to prompt and focus discussion rather than to generate individual decisions over which statement people agreed with.

<table>
<thead>
<tr>
<th>Prompt statements on information themes</th>
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<tbody>
<tr>
<td>A ‘People would be less worried about chemical industry sites if they knew more about them’</td>
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<tr>
<td>B ‘It’s better not to tell the public too much about the dangers in industry because some people would be inclined to panic’</td>
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As with the other questions addressed in the second set of focus groups, participants often drew on their own experience and view of their particular hazardous site in constructing and defending arguments. In this respect it is relevant to note the different information contexts across the case studies; ranging from the CIMAH leaflets, community newsletters and open
days in Langley, Low Moor and Fawley, to the entire absence of formal risk communication activity at Brinsworth.

7.2.1 Rights to information

The two prompt statements generated discussion around the question of whether or not information about risks should be provided for the public. In reflecting on the statements participants rapidly complicated the discussion by differentiating, for example, between their own and other peoples’ reactions to receiving information, between different types of information, between their local site and other sorts of industry and between different potential information providers. This all indicates that information and its provision are far from ‘neutral’ issues, with some involved conditional elements. A mix of perspectives and diversity of arguments defending particular points of view were encountered.

The dominant position encountered across the groups was that people should be informed about risks and about emergency actions. This position was defended on the following grounds:

- that people should be told about the risks they are living with
- that people needed to be told what to do in the event of an accident
- that anxiety and worry stems from secrecy and not being told, rather than from information provision
- that people are intelligent and sensible enough to deal with information about risks
- that only by having information about risk could people decide whether or not it was worth worrying
- that even if it makes you worry more, you still ought to know
- that only by having information could you decide whether or not to live in an area that was at risk (see section 7.2.4)

The following quote from a resident at Brinsworth, where no CIMAH information had been distributed, incorporates a number of the above points:

*Female 1: No. I think you're better telling people because then they know. You know what you're dealing with and then if anything does go wrong you'd know what to do and why you were doing it. You'd be alright. If you'd been warned that there was a chemical leak you'd panic but if you knew, if you were informed about it and they said all you have to do is close your windows, you know, as long as you don't breathe it in... I don't know, breathe it in directly you'll be fine. You wouldn't panic as much as if it was just all on the radio and what have you "keep in and close your windows", God, I'd be horrified. But if I knew more about it and why I'd got to do things and what would happen if I did it and not, I wouldn't worry half as much.*  
*Brinsworth 1 (2)*

However, arguments supporting information provision were also frequently accompanied by conditions regarding the nature and extent of appropriate information. Participants stressed the need to avoid complex or technical information and to concentrate on understandable and simple messages. It was clearly felt that most people would not want to find out more than what the risks and potential impacts were (in simple terms) and what they should do in an accident - as long as additional information was also made available for particular interested or concerned individuals if they felt the need to know more. There were also conditions placed around who should be providing information (see discussion in section 7.2.2).
A position arguing that it was unnecessary or unwise to provide the public with risk information generated much less support across the groups - although this did feature more strongly at Brinsworth where there was approximately equal support for and against information provision. Justifications for this position again took a number of forms:

- that people would panic and worry unnecessarily, picking up on the second prompt statement
- that it was better not to know about risks even if they exist (a form of ‘active ignorance’ usually linked to fatalistic statements about the inevitability of accident impacts)\(^1\)
- that if there was little evident concern about risks why bother telling people about them? (a strong theme at Brinsworth)
- that having risk information does not enable you to do anything about being at risk (for example if you cannot exercise choice over residential location), so what is the point of knowing?
- that knowing what to do in the event of an accident would do little to protect you - linked to expectations of a sudden ‘big bang’ or to doubts over the realism of the advice given - and that most people would ignore such instructions anyway

### 7.2.2 Openness, secrecy and trust

Arguments both for and against public information rights were accompanied by a pervasive view of site operators as inherently secretive, unwilling to divulge full information, unlikely to tell ‘the truth’, and more concerned with public relations than providing information about threats to health and safety (see earlier discussion of trust themes in chapter 5). This view was particularly strong at Low Moor and Jarrow, with some countering and more trusting perspectives evident at Fawley and Frankley - at Brinsworth BOC was seen more as having kept a low profile, rather than having deliberately withheld information.

This view of industry was though supported by examples of local experience to a lesser extent than is the case for other topics discussed in the groups. This suggests more of a general orientation towards industry, and in particular the chemical industry, than a specific complaint against local site operators. Analogies with other risks such as asbestos and nuclear risks were also used to illustrate the tendency to secrecy and information manipulation when dealing with public health and safety concerns. In some cases participants did though point to local evidence - for example in Low Moor to the delay in setting off emergency sirens during the 1992 accident, to ‘confidential’ information obtained from employees and to frequent incidents at the plant that ‘nobody gets to hear about’.

Where site operators had adopted particular initiatives such as open days (at Langley, Fawley and Low Moor), these were in general more welcomed as informing local people and displaying openness, rather than criticised for their PR focus. However, particularly again at Low Moor, but also at other sites, some people were very cynical about the motives of the company and suspicious that when visiting the plant they were only being allowed to see the parts that the company wanted them to see (see supporting discussion in section 5.3.4).

When the alternative of information being provided by government bodies rather than site operators was raised, there was little endorsement of its likely trustworthiness. The following quote expresses a typical sentiment:

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\(^1\) see Michael (1996).
Female 1: well [laughs] you know I don't know whether you would trust the government on anything they say to be quite honest. [laughs] I think they tell you that it's like a bit like the mushrooms isn't it. You know keep you in the dark and you're fed manure.
Low Moor 1(2)

Whilst the HSE were seen as being sufficiently disinterested to ‘tell the truth’, government and local authorities in general were, like industry, largely seen as ‘only telling you what they want you to hear’. The notion of an ‘independent body’ providing information gained much support across the groups (see further discussion in section 7.3).

Finally, there was some, albeit limited discussion of the role of the media as information provider (reflecting in part the low media profile of most of the sites). Whilst there was familiar, and perhaps expected discussion of the media’s tendency to sensationalise, there was equal recognition of its role in uncovering ‘the truth’ and circumventing industrial secrecy; in particular in disclosing the incidence of health impacts such as cancer clusters etc.

7.2.3 Responses to CIMAH information

Whilst the main focus of our research was not on the retention of emergency action information, evidence from the focus group discussions supports the results of other studies which have shown a far from complete pattern of reception, recall and retention. Some people recounted the ‘shelter in place’ instructions in some detail and knew where their leaflets were, particularly where there had been a recent distribution, for example at Frankley (one month before the research took place), or distribution on a regular basis for some years (at Langley, Fawley and Low Moor). Many others were either unable to remember receiving the leaflets, had not kept them or were unable to remember what they said in any detail. At Llandudno in particular where there had been no circulation of information for 3 years, there was very little recall. Where people claimed to have never received a leaflet this, in part, appeared to relate to a high turnover of population in rented accommodation. The following quotes illustrate varying degrees of retention and recall of emergency action information:

Male 4: But they tell you to put it in a safe place so you (laughs) you can sort of see it if the siren goes off. Mine's in the cupboard in the kitchen. And it's not where you can see it at all cos the kids wouldn't know where to find it.
Male 3: Mine's in a place I wouldn't find it, definitely.
Frankley 2 (2)

Male 2: And if a certain siren does go off they give you advice to go whereabouts in your house close all your windows and go to the bottom I think. Is it the bottom? Don't go upstairs. Lock all your doors. Get your get all your kids in get all your dogs all your cats your fish your catfish and everything.
Low Moor 6 (1)

As noted earlier there was general support for the principle of information provision, and no direct criticism that CIMAH leaflets had been distributed. There was however criticism of the limited or absent information on hazards and potential accident impacts. There was also scepticism about the emergency action instructions given and the effectiveness of warning systems (for both ‘alert’ and ‘all clear’), particularly where people had experienced incidents at first hand (or in the case of Fawley a false alarm) and had been able to compare the complexity of real emergency situations with the simplicity of the messages conveyed in the leaflets. For example, the following experiences were recounted by people at first Fawley and then Low Moor:
Male 1: But when they have the actual false alarm then the schools all reacted and they did all the right things, everyone had switched on their radios to radio 7 and waited to hear is this real or is it pretend and it was actually three quarters of an hour I think before the all clear sounded, but obviously they reacted as if it was for real, and nothing came over on radio 7 so we just sat there for ¾ of an hour with a bunch of kids who were frightened to death, half of whose fathers worked in the refinery and they knew what it meant, waiting for somebody to reassure us one way or another whether this was actually the real thing or not.
Male 2: It was a major lack of communication wasn’t it.
Fawley 2 (2)

Female 1: There’s always something and they don’t mean the fire’s a classic that it was burning two hours before they set the public alarm off.
Female 2: Yes it was.
Male 3: Tried putting themselves yeah.
Female 1: And we I mean we had children on holiday. My children being two of them stood watching this fire and they didn’t even set the public alarm bell off to say Get in your house
Male 3: And siren yeah.
Female 2: And shut your windows.
Female 1: Which is what they’re supposed to do immediately. So they lost an awful lot of public confidence which I think they really are working hard at. I mean I don’t work there and none of my family do. Erm but I think they are trying
Low Moor 2(1)

Looking across all the critical or sceptical comments the following points were made:

- that sirens or police wouldn’t be heard through double glazing or with the ‘stereo up loud’.
- what do you do if you are not in or near your house, or on the bus?
- that information would never be passed on by people selling their house
- how is turning off a gas heater going to protect you from a toxic gas?
- that going upstairs and shutting your windows isn’t going to protect you when the ‘whole place goes up’ (with some links drawn to the ridiculed ‘Protect and Survive’ nuclear warning information)
- that during actual accidents, at Low Moor and Langley, people ignored the instructions and stood and watched the fire (an observation typically made by people who had followed the instruction to go indoors)
- that during accidents the emergency services response was not very competent
- that local emergency services were too distant or poorly resourced to be able to make an effective response

7.2.4 Information and residential choice

One context in which issues of information provision repeatedly and rather unexpectedly arose in the groups was in relation to decisions made over residential location. As discussed elsewhere a major theme of discussion, both in general and in relation to the planning scenarios (see section 7.4.4), was one of choice, with much disagreement over the extent to which people had a real choice about where they lived, and whether or not it was fair to argue that people could exercise an informed choice about whether or not to live near to an existing source of major accident hazard. In this context it was pointed out that there was no mechanism through
which prospective buyers of houses in areas at risk were required to be informed of the existence of the major accident hazard. Indeed it was seen as in the interests of all others involved in property transactions - sellers, estate agents, builders - not to disclose such information. Some people also went on to argue that there should be a mechanism in place for such information to be provided.

7.3 REGULATION AND PARTICIPATION

Female 4: Well they do leave it to the experts.
Female 1: But. But we are the experts on somethings you know.
Female 3: Don't leave it to the government for God's sake.
Jarrow 3 (2)

In order to explore issues of regulation and safety assessment, two further sets of prompt statements were utilised as shown in Tables 7.2 and 7.3. In discussing these, participants drew in part on their views and sometimes inside knowledge of regulatory activities and safety management at their local major hazard site, but also on their experiences of health and safety practices where they had themselves worked. Analogies were therefore drawn between regulation at hazardous sites and a wide range of other industrial, commercial and service activities.

<table>
<thead>
<tr>
<th>Table 7.2</th>
<th>Prompt statements on regulation</th>
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<tbody>
<tr>
<td>A</td>
<td>'The chemical industry understands its operations better than anyone else and it is in its own interests to make sure they are safe. It should be allowed to get on with the job without too much outside interference'</td>
</tr>
<tr>
<td>B</td>
<td>'There needs to be strong government regulation to make industry reduce risks to the public'</td>
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</tbody>
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<tr>
<th>Table 7.3</th>
<th>Prompt statements on involvement in safety assessment</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>'Setting and monitoring safety standards should be left to government regulators'</td>
</tr>
<tr>
<td>B</td>
<td>'Industry's assessment of risks should be checked by independent experts'</td>
</tr>
<tr>
<td>C</td>
<td>'Local people should have some say about what precautions industry takes to protect the public'</td>
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</table>

7.3.1 The need for regulation

In both responding to the regulation prompt statements, and in other discussion across the groups, there was strong and almost universal support for tight regulation of hazardous industry. Only very few people agreed with the argument that there could be too much regulation and that industry could be trusted to run hazardous plants with little 'outside interference'. This rejection of deregulation was based on a combination of strongly expressed arguments:

- that companies will put profits and shareholders interests first
- that 'corners will be cut' and shortcuts taken
- that even the best safety standards can slip over time
- that regulation is needed to look after the public interest and public safety
- that it is better to have higher costs from regulation than to risk lives
The following quotes illustrate a number of the above arguments:

*Female 1:* And people come and go as well the management come and go and people might have different attitudes. Erm it's just too dangerous to allow them to regulate themselves. .... Low Moor 3 (2)

*Male 3:* Yeah. There’s there’s a risk element to to every industry. And they they do take risks. There’s there’s no two ways about you know what I mean. Er especially where chemical the chemical industry’s concerned you know.

*Male 5:* I mean there was .... overriding to me is the actual shareholders of any company. Because the shareholders to me don’t as much worry about the sense of safety as what they do profit. They’re there for greed. They’re that’s all they’re in They’re interested in money and that’s all there is to it. Llandudno 2 (2)

Even where people agreed with the first part of the first prompt statement (‘that industry understands it operations better than anyone else’; see Table 7.2), they were unwilling to see this used as an argument for not having strong regulation.

The very few people who argued in favour of de-regulation were encountered mainly at Fawley. They argued, drawing directly or indirectly from experience of work at the site, that Esso had a good safety record (something that the company had publicly stressed for many years) and ‘knew what they were doing’, and that too much regulation might get in the way of their best practices. Contrasts were drawn in this respect between Esso and other local companies, especially ReChem. Others, including some ex-employees, disagreed strongly with this assessment of current safety at Esso, arguing that there had been a decline of safety standards as a result of demanding and the increased use of subcontractors. In this context it was argued regulation was all the more important.

### 7.3.2 Regulation and trust

In discussing aspects of regulation and scrutiny of safety matters, various different parties actually, or potentially, involved were considered and evaluated in the groups. Two key criteria permeated these evaluations:

- the extent to which the ‘public interest’ was their primary or sole motivation. The notion of independence was paramount here, with any personal or collective monetary interests in particular seen as conflicting with the prioritisation of public safety

- their ability to be effective in regulating or scrutinising safety. Questions of expertise and resources dominated this evaluation.

By these criteria different participants were evaluated as follows (the HSE is discussed separately in the next section):

*Government* - the generalised notion of ‘government’ led to many expressions of cynicism and distrust. Explanation here related both to a general distrust of politicians and authority, and to more specific points about government being primarily concerned about jobs and tax income rather than safety, and the perceived close ties between politicians and industry. Where government was equated with politicians, a lack of expertise and understanding was also inferred.

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2 we should note that this wasn’t the view of either the company or of the local HSE inspectors.
Local authorities - criticism here followed similar lines to that of government in general, with little support for the notion of local councillors representing the public interest. Planning decisions in particular were identified as instances of where private rather than public interests could dominate (see later discussion in section 7.3). Cynical perceptions of local authority complicity and corruption were not uncommon. Doubts were also expressed over the adequacy of resources available to local government in terms of both manpower and expertise.

Experts - there was much reliance placed explicitly and implicitly on expertise. The notion that experts knew best and were the only ones who could really understand the complexities of chemicals and safety measures was accorded wide support - although this was also expressed as 'having' to trust the experts in this and many other risky situations. A key question though was for whom the expert worked, with 'independent' experts (introduced in one of the prompt statements), without connections to government or industry, being most trusted. In a number of groups this led to some wrestling with the notion of independence and whether anyone could ever be truly independent and disinterested, for example:

Male 1: Well I think it should be checked occasionally by somebody that's not connected with the firm but like [male name], you know, who's independent these days anyway, you know, nobody's independent really are they, you know, nobody like experts, I mean there's always somebody else at the back of somebody else if you know what I mean.

Male 2: The're going be .... the independents are going to be dependent on whoever's paying the bill.. Fawley 4 (2)

Trust for some people also related to demonstrated actions by those giving reassurances over safety. A typical comment of this kind related to whether or not they were themselves prepared to live in areas at risk, for example:

Male 4: I would feel more inclined to believe him if he came and lived by the thing.
Female 1: It's all down to trust isn't it.
Male 4: Yeah. And basically nowadays there is none. Langley 4(2)

The legal system - there was little discussion of the role of the legal system. Where this arose it was universally to criticise the level of fines imposed on companies after accidents (this arose particularly strongly at Low Moor). There was a general feeling that fines were inconsequential to major companies and that more punitive and exemplary penalties should be imposed to 'make it hurt'.

The various doubts expressed over the roles of all parties led to frequent calls for a combination of government regulation and independent scrutiny, with the notion that there would be cross-checking and verification of safety standards.

7.3.3 Public Participation

The argument that local members of the public should have some say about what precautions industry takes to ensure public safety, which was introduced by one of the prompt statements but also raised in other contexts, was predominantly rejected as inappropriate for two reasons. First, because of the lack of expertise amongst ordinary people and second, because they wouldn't in any case be 'taken seriously' or 'listened to'. As already noted there was rather a sense of having to rely upon 'experts' to ensure safety standards. For example:
Female 5: .... There again they say you can interfere too much and we we don't know what anything about it. But we don't know anything about it. What have we got.
Female 5: There not gonna listen to us are they.
Male 4: We've not really got much of a say anyway you know.
Female 5: No.
Male 4: You can air your views but I don't think they really take you seriously
Llandudno 2 (2)

Those few arguing strongly for local involvement contended that ‘ordinary people’ could have useful expert knowledge through their work experience (e.g. at Fawley through having worked at Esso), that some aspects of safety management did not need complex technical understanding (e.g. site security measures) and that public representatives could at least play a role in providing ‘disinterested’ information for the local community.

It was also argued by a few participants that ordinary people were capable of acquiring the necessary knowledge for a general understanding of the issues and that it should be the responsibility of the authorities or the company experts to ensure that the necessary information was made comprehensible. Several people proposed the equivalent of ‘local liaison committees’ (including where these already existed!) as a way of involving local people - although discussion rapidly progressed to the problem of public ‘apathy’ and any meeting or committee attracting only the ‘usual people’ with a strong viewpoint to express.

7.3.4 Health and safety and the HSE

There was a general recognition of the involvement of the HSE in some way in the regulation of hazardous sites. To a lesser extent local authorities and the Environment Agency (or its constituent parts) were also seen as being involved. Participants made references, in various contexts to the HSE, or to ‘the health and safety’ or ‘factory inspectorate’, and, as noted earlier, frequently drew on their own workplace experience (in this respect there was some conflation of the roles of HSE and local environmental health department).

Overall there were more positive that negative assessments made of the HSE. In justifying these assessments there were four key factors involved:

- independence from government and industry - there was much disagreement and sometimes debate about the status of the HSE and the extent to which it was part of, or independent from, government (opinions were about equally divided on this issue). As discussed earlier, independence emerged as a key determinant of trust in regulators, and for some people any suggestion of a link with government (and therefore politics) led to critical evaluations. Getting too close to industry and consequently not acting strongly enough and, for a few cynics, being susceptible to ‘backhanders’ also led to critical evaluations. There following are examples of different points of view:

Male 8: Up to a point Health and Safety is good. Up to a point. But they’ve got no control over that sort of industry. That is a multi-million pound industry. And they they it’s like you putting a poodle to watch a rottweiler. No bloody way. You know it’s got no teeth and it’ll just yaps and that’s all Health and Safety do.
Male 9: We should have someone somebody for the people you know for us lot.
Should have somebody for us Jarrow 4 (2)
Female 1: They are independent actually in the way work, when they are investigating cases for instance, they aren’t actually on the firms side, they’re actually just looking at plain facts aren’t they ... Fawley 1 (2)

• proactivity - there were also disagreements about the extent to which the HSE acted proactively. Some people argued that they did act to stop unsafe practices and couldn’t be blamed if ‘human error’ caused accidents to happen. Others contended that the HSE only seemed to do things after accidents had happened (perhaps reflecting the greater visibility of accident inspection roles through the media). It was also argued, particularly at Low Moor, that the fact that accidents happen demonstrated that they were not being proactive or effective enough.

Male 4: ... it’s difficult because you feel again that in a lot of cases they always shut the door after the horse has bolted. Things have to happen and then the Health and Safety are in, the report of the Health and Safety Executive said this, and this should have been done, and this hadn’t been carried out. Langley 2(2)

• prior notice for inspections - participants disagreed again about whether or not employers would have notice of inspections visits from the HSE. Where this was discussed the dominant view was that they would have prior notice, allowing employers to ‘put everything right’ for the inspection. There was much drawing on personal workplace experience to back this view, with stories told about the ways in which safety inspections had been handled and manipulated. For example:

Male 3: Well they do, but they come round like once or twice a year and you know they’re coming so you supply everybody with goggles and gloves and take everybody on overtime for the week before. It’s true, it happens everywhere. And then everything is spick and span and they’re doing everything the right way and then he goes away for another 6 months and you go back to your old ways. Every company does it.
Brinsworth 1(2)

• level of expertise - a less frequent but sometimes important line of discussion revolved around the level of expertise the HSE had in regulating complex chemical processes. Positive evaluations were usually made here. Critical comments related to the range of places and technologies that HSE had to deal with (‘how can they be expert in everything?’), the problems in assessing and regulating new chemicals and products and that HSE inspectors could only have gained expertise by having worked in the chemical industry, which linked back to arguments about ‘independence’.

7.4 LAND USE PLANNING ISSUES AND SCENARIOS

Male 1: ‘You can’t just build a plant for toxic gases and say ... we produce lemonade there and start turning mustard gas out, can you?’ Brinsworth 4 (2)

Male 1: Right, so it’s Friday 13th and the wind’s blowing towards town.
Fawley 6 (2)

7.4.1 Planning scenarios

In order to provide some insights into how publics at risk view a number of key policy questions in this area, the second of the two meetings of each first group included the use of
two planning decision-making scenarios. Both of these scenarios utilised hypothetical maps of hazardous sites and areas at risk, with participants presented with a decision-making situation and a number of different options to choose from in resolving each situation. In this sense the scenarios were quite artificial and the situation was not one in which most people would ever find themselves. The scenarios were deliberately constructed to:

- be simple and straightforward
- avoid the use of unfamiliar technical terminology
- generate discussion about general principles and approaches rather than about the specifics of their local or any other ‘real’ situation.
- limit the options available in deciding on an appropriate course of action

7.4.2 Planning themes in the first round of focus groups

Whilst planning and siting issues were predominantly addressed through the planning scenarios in the second round of focus groups, they also featured more spontaneously as part of the discussion of the local risk context in the first round. A number of arguments and observations were made.

- that the relevant hazardous site was poorly sited and that there was housing and other developments far too close to it. This criticism was particularly made at Low Moor and Jarrow where there was a day-to-day nuisance from odour and perceived health risk alongside an accident risk. Participants in Low Moor were particularly critical, seeing the failure to control the growth of the Allied Colloids site and the accumulation of population around it as a key part of the complex of factors leading to local resentment towards the site and stigmatisation of the area.

At Llandudno there was also particular criticism of the proximity of a school to the LPG installation and the way in which housing had been allowed to be built after the hazard was in place:

Female 2: There was er none of these houses anywhere around here apparently. And they've just been built up and built up around. So really their operations are like grandfather rights really aren't they.
Male 3: But it makes you wonder about planning permission that was given for all the housing then doesn't it.
Llandudno 6 (2)

At Langley and Fawley, comments about siting emphasised more the historical ties through which the community had grown alongside the hazardous plant rather than the failure of planning to control siting and accumulation of nearby population.

- that public safety concerns would not have any priority for local councils. As noted in section 7.3.2, there was widespread cynicism about the motives of local authorities, with planning decisions identified as examples of where site operators and developers were in a powerful position to influence local authorities. There was also little expectation that public participation would have any impact on decisions made.

- that because planners had allowed housing to be built close to the major hazard site it couldn’t be that dangerous. This more trusting perspective featured only at Brinsworth,
where older participants pointed to the construction of housing alongside the BOC site boundary:

*Female 1: Yes, yeah. Well, we always thought that, well, they allowed planning permission and then they built all this estate so it must be relatively safe to let somebody’s back garden onto it so we’ve always sort of trusted...*

*Brinsworth 5 (1)*

The fact that discussion of planning and siting appeared spontaneously in these ways provides contributory evidence towards a conclusion that planning control has a salience and relevance to publics at risk.

### 7.4.3 Participant engagement with the planning scenarios

A number of preliminary but important points can be made about the way in which the group participants engaged in the scenario discussions. Most people appeared to be able to understand the scenarios and happy to discuss and make choices between the available options. Where they did not really get involved in the discussions or failed to express a choice about what ought to be allowed, the following reasons were expressed in some cases:

- that it was morally unacceptable to be making decisions about risking peoples lives,
- that they could not imagine themselves effectively in the position of planning decision-makers.
- that the scenarios presented would inevitably be based on highly uncertain expert assumptions
- that they were unable to make sensible choices without more information
- that they remained undecided and unsure about what they thought

As noted at the beginning of this chapter, it was striking across all the groups and sites the extent to which people related the explicitly abstract and hypothetical planning scenarios to their own particular local situation and experience. Participants would, for example, attempt to locate where they lived on the map, translate the relative positioning of the hazard site and nearby development to features in their own local area, and talk about the risks involved by referring to their experience of living near to their particular hazard site. This observation in its own right provides strong support for the comments made elsewhere regarding the importance of local context and experience for the ways in which people think and reason about risk. The scenario discussions also re-enforced observations made earlier about the lack of compartmentalisation in public perceptions of risk. Whilst, the scenario descriptions directed the participants to think specifically about accident risks, people would frequently also reason in relation to other impacts that a plant would have on the local area such as risks from everyday pollution.

### 7.4.4 Planning scenario 1: housing development in the vicinity of a hazardous site

#### 7.4.4.1 The scenario and its purpose

The first planning scenario presented participants with a decision about where to allow the construction of new houses on a number of development sites near to an existing hazardous installation. The participants are told that there is a housing shortage in the area that only building on all the development sites would fully address, and that the area around the site is
already built up with a mix of land uses (housing, industry, retail). As shown on Figure 7.1 the scenario is constructed so that of 4 development sites, two (A and B) are located close to the site and on the side which receives the predominant wind direction.

The participants are therefore told if a release of a harmful gas occurs sites A and B are more likely to be affected by the impact of both small and large scale releases (small and large scale are represented by two overlaying and moveable accident plumes; see figure 7.1). Sites C and D are in the direction that the wind blows only 20% of the time and are less likely to be affected both because of wind direction and also because only the large scale release would reach these more distant sites. The participants are told that of the range of accidental releases which could occur at the site, the smaller releases are more likely to occur than the large scale.

This scenario is designed to explore the following:

- the range of arguments deployed by participants to justify different choices

- the extent to which development restraint is seen as a reasonable and necessary action, particularly in an area which is already built up

- the views of participants regarding the criteria that should be used for determining the limit of impact of an accident event when planning decisions are being considered.

7.4.4.2 Participant's responses

The participants were initially presented with three options; to build only on sites C and D; to not allow building on any of the sites; or to allow building on all four.

Looking across all of the groups all three options were accorded support, although some participants introduced a fourth option of moving the plant (discussed further below). Participants put forward a range of arguments to support their particular choice, with these arguments often challenged by others in the group. Whilst counting the choices made gives some indication of support for different options, the results of this process need to be used with care. As already discussed, some of the participants did not feel able or chose not to make choices (about a sixth of the total) and even where choices were expressed these were made with varying degrees of certainty.

7.4.4.3 Option 1

Option 1 allowed building to take place on sites C and D but not on sites A and B. Overall, this option received most support, with approximately half of all participants making this choice. Option 1 was particularly dominant at Fawley and only at Brinsworth was another option accorded more support. The following reasons were given for choosing option 1:

- the predominant argument was one of compromise; that it was reasonable to balance the low probability of a large accident affecting sites C and D against the need for housing in the area; but that it was not sensible to allow housing as close as A and B. Whilst the scenario did not provide a statistical risk figure for either scale of accident, most participants were content with the notion of it being 'very unlikely' or 'more likely'. For example:
Figure 7.1 Map and gas plume overlays for planning scenario 1
Male 3: Yes, I think there's less likely the big catastrophe happening because if a small one starts that could possibly be quick enough to shut it down but the small one would affect A and B but the small one wouldn't affect C and D, so forget A and B and go for C and D and call it green open space.
Fawley 5(2)

- in addition some people pointed to the further protection that could be given to sites C and D through emergency planning actions

Whilst for those supporting option one there was therefore a readiness to seek compromise, there is also clearly a feeling that development restraint is relevant where risks are higher. The compromise position could though be a reluctant one; participants across the groups commented that in an 'ideal world' they would rather see the plant moved, or no development allowed at all in the vicinity, but recognised that in reality trade-offs had to be made.

In several groups in Langley and one in Jarrow, participants chose option 1 but suggested that sites A and B could be used for industrial uses, with a reasoning closely in line with that used by the HSE in differentiating between different types of development. The particular occurrence of this suggestion in Langley and Jarrow may have reflected a familiarity with mixed land uses and local concerns about de-industrialisation and the need to attract new sources of employment.

7.4.4.4 Option 2

Option 2 allowed no housing to be built on any of the four sites and was supported by approximately a fifth of the participants across the groups, with a higher level of support at Jarrow and Low Moor and very little at Brinsworth.

Here the justifications made were largely moral ones, that chemical plants should not be located in residential areas and that it was wrong to put any more people at risk, regardless of the probabilities involved or the need for housing in the area. People choosing this option did not actively argue for the plant to be relocated but recognised the need to prevent a poor existing situation from getting any worse (see discussion of the intervening development issue in the next section).

7.4.4.5 Option 3

Option 3 allowed development to take place on all four sites and was supported by about a fifth of participants (the same proportion as for option 2). Support was much stronger at Brinsworth than at other sites, to the extent that it was the option most frequently chosen (a pattern fitting in with observations in chapters 5 and 6 about the low level of concern and higher level of toleration at Brinsworth).

Again, a number of arguments were used to justify this choice.

- overall the predominant argument made was not one of comparative probabilities or the low likelihood of accident events, and very few people defended their choice on the grounds that they simply trusted the site operators and regulators to keep plants safe (although both these perspectives were more significant at Brinsworth). Also a fatalistic argument in only a very few cases:
Female 3: Yeah three for me because it doesn't matter where you are if you've got to go you've got to go.
Female 1: Yes that's the way I feel.
Female 3: My feeling is that from the day you're born till the day you die your life is mapped out.
Jarrow 3(2)

- the dominant argument made was one of 'informed choice', that there was no need to prevent housing being built as it was up to individuals to make their own choices about where they lived and which risks to avoid and which to take (see section 7.4.4.7 for further discussion).

- an 'intervening development' argument was also deployed, to contend that if people already lived in the area then adding a few more houses was not worth worrying about. This argument did not however figure strongly and was contested by others, for example:

Male 1: In hind-sight, if that chemical plant hadn't been there all the houses wouldn't have been built. So if they were building a plant now they wouldn't allow a plant to be built in such an area. Or if it was a new plant they wouldn't allow buildings to be built round it. And if that's good enough for people now, it's good enough for the law now. The fact that my house is already here we can't change but the idea is getting older and get wiser and do things right in the future.
Fawley 8(2)

7.4.4.6 Option '4': remove the hazard

Although participants were presented with a choice of only three options for the first planning scenario a small number resisted this constraint, arguing instead for a fourth option of removing the plant from its existing location (this did not feature at all at Fawley and Brinsworth). Others identified removing the hazard as an 'ideal option' in an 'ideal world' but then rejected it in the face of 'real world' constraints. Those few people that maintained 'option 4' as their preferred choice argued that it was wrong to have chemical plants in urban areas. For example:

Female 2: Yeah move the chemical plants and they could get more houses. ..... I mean houses have got more right than what chemicals have.
Jarrow 2(2)

It was also argued that the onus should be on the company to remove risks rather than the nearby community take action to limit them, and that only by removing the plant would those people already living in the area also be protected.

7.4.4.7 Informed choice

The question of 'informed choice' became the most contentious point of discussion in many of the groups with both strong advocates and strong critics of a reliance upon individual decision-making (this theme also featured in group 1 discussions, see chapter 5). It is particularly significant that choice became such a key issue for participants without any direct prompting from the facilitator or through any explicit inclusion in the description of the scenario and options available. For these reasons it is appropriate to consider the discussion about informed choice in more detail.
Those people supporting informed choice argued that chemical plants were pretty obvious local features (particularly in the case of Low Moor and Fawley), but that if information was provided to people moving into an area (by builders or the local council for example) telling them about the plant and the risks involved, then an informed choice could be made. Two examples of this position are given below:

Male 1: Yes, so you do it at your own risk don’t you, it’s like smoking, it’s like crossing a busy road, it’s like playing Russian roulette, you do it at your own risk. So I still stick to number 3, build on all of them.
Brinsworth 3(2)

Female 4: I'd allow all of the sites to be built on. Thinking along the principle the people living in A and B should know what they're up against. I mean as me living in that sort of area I make a conscious decision to live there. Okay again I'm young. I can move out if I want to. Erm I know okay the foolproof computer can one day break down. I can be blown to smithereens. It's the choice I have. You have to give people that choice. .... There there's a risk everywhere so as long as people were aware of the risks I'd allow them to build on all of the sites.
Langley 5 (2)

This reliance on individual ‘informed choice’ was strongly contested by others providing sometimes an additional justification for the choice of options 1 or 2. It was argued that there was neither choice or information necessarily available to people, and that relying upon choice was also inequitable. Participants own experience was repeatedly drawn on to substantiate the points made. The following specific arguments were made:

- the strongest and most repeated challenge made was that choice was not available to council tenants and people renting from housing associations, who often have to accept accommodation they are allocated.

Male 1: You haven’t got a choice.
Male 2: It’s a case of take it and like it and lump it. Shut your mouth and get on with it.
Male 1: Me and my family were in bed and breakfast and then half-way housing and then this house come up and they said, well, take it.
Male 2: That’s right, you’ve got no choice anymore.
Fawley 6 (2)

Female 1: Yes, but with the council once you’re offered a house, you put your name on a housing list and once you’re offered a house, you turn that down you go to the bottom of the list again basically. And that’s not fair, if somebody really didn’t want to live next to it, they shouldn’t have to..
Brinsworth 1 (2)

- it was also argued that situations can change from when you first move in, things happen that you can’t anticipate (e.g. plant expansion, accidents etc..) and then people may not in reality be able to exercise their choice and sell their house and move out. This feeling was particularly strong at Low Moor where there was a strongly perceived problem with persuading people to buy houses near to the plant.

- the factors constraining peoples mobility in other ways were also stressed, including close family ties in particular areas
• the unfairness of relying upon choice was argued on the basis that it was morally wrong and that it was rather the job of government to protect people, particularly those that who are less well off and who may be more pressurised to compromise on safety.

    Male 3: No. I think No. I can't agree with that. No. I can't agree that you can say a child'll play with a dangerous toy and er. Somebody's got to say Whoa wait a minute we're not prepared to let you play with that dangerous toy.
    Low Moor 4 (2)

The question of information availability when residential choices are being made has been raised earlier (section 7.2.4). In this context the following arguments were made

• that in practice it is very difficult for people to know that a plant is hazardous through their own observation

• that people are not in practice told about any risks when they move house

• that even if the company or the local council were compelled to make information available they wouldn't necessarily admit to how dangerous the site really was.

7.4.4.8 Further points

Local development restraint - there was relatively little discussion of actual development restraint applied by local authorities in the case study areas, even though as stated earlier there was a lot of cross referencing from the hypothetical scenarios to people's local situation. Only in Fawley and Langley was there some awareness of the fact that developments were being locally prevented on hazard grounds. Where this did arise it is significant that there was support rather than criticism of such planning policies.

Local politics and public safety - as noted earlier, there was frequent discussion of the type of decisions that would in practice be made by local authorities and the lack of concern for safety shown by all parties to the development process. For example:

    Female 1: But they're not going to live there they're going to put the likes of us in that place. So they'd still pick that whether that was the danger or not.
    Female 2: They'd be ..... 
    Female 1: And not tell us anything.
    Female 2: they'd be in E and F wouldn't they the councillors.¹
    Jarrow 2(2)

Uncertainty - only one or two people in each of the case study areas, challenged the certainty with which accident scenarios could be constructed. There was also some questioning of the significance of where people lived to the level of risk they faced, given that they could also be engaged in activities at other locations near to the chemical site, such as work, shopping or catching the bus.

¹ by 'E and F' the participant is indicating that the councillors would be living at other locations well away from the chemical site.
7.4.4.9 Participants responses after levels of impact are introduced

In order to explore the specific question of impact thresholds, additional information was introduced by the group moderator. In the initial description of the scenario, the outlines of the small and large gas clouds were described only as showing the area over which the gas would have an effect - without any specification of what that effect might be. To be more specific, after an initial period of discussion the group moderator introduced the fact that the boundary line showing the limit of the small gas cloud indicated the area over which deaths could happen, particularly amongst people more vulnerable to the effects of the gas cloud. Participants were asked (i) if this information changed their views of the situation at all, and then (ii) if they felt that the boundary line should be set at the limit of where deaths could occur, or whether it should be extended to include a wider area over which serious long term injuries and disabilities could also be experienced.

In practice it proved difficult to get group participants to take on board the question of whether thresholds should be determined by risk of death or dangerous dose, and to focus discussion on these particular issues. For this reason it is not possible to draw clear policy implications from this section of the scenario discussion. However, it is worth noting that the discussion in several groups served to highlight that people rarely consider (or prefer not to consider) the potential consequences of a major accident for the local population. In these groups the introduction of the possibility of death or serious disability induced a marked change of atmosphere and some very sombre reflection, although the mood soon lifted as the discussion continued.

7.4.5 Planning Scenario 2: hazard intensification at an existing site

7.4.5.1 The scenario and its purpose

The second hypothetical planning scenario presented the participants with a decision focused on the source of hazard rather than prospective development in the vicinity. The group was presented with a map (see Figure 7.2) showing two existing installations neither of which currently holds hazardous chemicals that could result in an accident that would extend off-site. In the scenario described to the group the two companies involved have however decided to embark on a joint venture that would involve the construction of a plant extension including the storage and use of chemicals that if accidentally released could have a significant impact beyond the site boundary. A choice has to be made over which of the two existing sites is the most suitable for this new investment. Here the situation is again carefully structured with Site A located near to a scattering of houses that would be affected by both small and large scale accident events (described, as in the first scenario, as ‘more likely’ and ‘very unlikely’ and delimited by moveable plume overlays). However, a large scale release would not result in a significantly greater number of casualties as the gas cloud would not reach the major urban area shown on the map. Site B in contrast has no housing in the immediate vicinity, so that a small scale accident could lead to no off-site casualties. However, a large scale accident would reach the major urban area leading to a far greater impact in terms of numbers of casualties than is possible from site A.

This slightly involved structuring of the scenario is intended to again probe at the reasoning people deploy in making choices between available options, with a particular focus on the significance of societal risk considerations.
Figure 7.2 Map and gas plume overlays for planning scenario 2
7.4.5.2 Participant's responses

As with the first planning scenario, the responses made by participants to the scenarios were more involved than the simple choice presented between either site A or B. A small group looked again for an additional option that moved the site completely away from population, whilst others made their choices conditional on a restructuring of the present spatial configuration of hazard and housing. A general point made by a number of people was that there was a big difference between dealing with an existing hazard, where there were more constraints on what could be done, and making choices about locating a new hazard.

7.4.5.3 Site A

Locating the hazardous plant extension at Site A was overall accorded most support with half of all the participants choosing it. It was also the most favoured option in each of the case study areas. The principal justification for this choice was the greater numbers of people that could be affected by an accident at Site B, despite the low probability of a large scale release occurring. This suggests that the numbers potentially affected by an accident (known as 'group risk') is significant for many people. An examples of this position is:

*Moderator*: You're site A, tell me why.

*Female 1*: Yes. Because it doesn't matter if you've got the small ones or the big ones, there's still only going to be a few affected.

*Moderator*: Right, there's less people.

*Female 1*: Yes, and there's not much chance of it happening anyway, like you said, but because it's better for just a few people to be affected than to risk losing a town.

(Fawley 3(2))

The only complication added by a small proportion of those choosing this option was to suggest that the houses around Site A could be compulsory purchased to clear away all population at risk, or, alternatively, that the company could offer to buy up houses in the area and if existing residents then decided not to take up the offer it would be their choice to be living at risk. Whilst this alternative solution was enthusiastically endorsed by some participants, for others it was seen as unfair and wrong to impose a hazard and either force people to move or put them in the invidious position of having to accept new risks in order to remain somewhere they may have lived for many years. To an extent these discussions, though less frequent, echoed the highly contentious debates in scenario 1 over choice and equity.

7.4.5.4 Site B

Site B was chosen by approximately a quarter of the participants with support stronger at Low Moor and Brinsworth.

The principal argument made was based on probability, the fact that the large scale release would be very unlikely to happen (especially at a new plant) and that it was therefore more important to protect against the smaller more likely incidents that could affect people at site A. For example:

*Male 1*: Yes, I don't think, personally I don't think they ought to build it at all. But if I'm deciding then it would probably be plant B because you could... just see it like this, big accident is going to happen, one every 300 years, but a little accident is going to happen
every 2 years which where would... where would you rather them put it, A or B, B because in 300 years it's never going to hurt anybody.

Brinsworth 3 (2)

Some also took note of the greater distance between the site and the large urban area and suggested that this would allow for emergency response and evacuation in the event of a serious accident.

7.4.5.5 ‘Site C’

A small number of people across the sites firmly stuck to the position that they did not want to see a hazardous plant built where any people would be put at risk; that it was unfair and immoral and that despite any calculations big accidents can still happen:

Male 4: Whichever site. Because if if lives are lost at that site or this site you're still losing lives. And if you only lose half a dozen this site and sixty at that site that half a dozen's still precious lives. It's still precious. If you only lose one it's one too many.
Female 1: It's true.
Male 4: So I wouldn't allow them to be there at all.
Low Moor 4(2)

Rather than choose A or B they therefore suggested alternative remote locations. Again other people stated that in an ideal world this might be best, but that in practice it was very difficult to achieve. There were also accusations of NIMBYism thrown at those arguing for alternative locations, linking to the discussion in the first round of groups (see section 5.4.4).

7.4.5.6 Further points

Encroachment - across all of the case study areas, there was unprompted discussion of the potential for encroachment of housing and other development towards the two fairly remote sites. Most saw this as inevitable with little likely to be done about it by the local planners; as a consequence there were calls for strict controls to be applied.

Environmental concerns - given that the two alternative sites were in ‘rural’ rather than heavily urbanised locations, there was a striking lack of concern for any possible environmental impacts. Only a few people raised this question, and largely in relation to the possibility of impacts on food production and the food chain. Where discussion did move towards environmental impacts, the predominant view by far was that human health and safety must take priority over environmental impacts.

Agency, politics and participation - again a strong theme of discussion related to the political realities of decision making and the ability of ordinary people to have an influence on decisions made. Points made here included observations about the likely political influence of people living in the ‘village’ around site A (based on assumptions about village residents typically being middle class), the ‘inevitable’ outcomes of planning processes and the constraints on local control in the face of mobile capital investment. Some of these are illustrated by the following quotes:

Male 3: There's a sort of bureaucracy that takes over, it's there, in anything like this. They have a public enquiry that takes about a year to sort out and then they have to discuss the findings which takes another bloody year. Then the damn things built anyway.
Male 2: Or they do an interim development. They start and they sneak a few things in and a couple of months later they sneak a bit more in and so on. And before you know where you are...
Male 1: Exactly. Yeah, that's what happens.
Fawley 6 (2)

Male 2: And that, again it's down to finances and the local government might say look, if we don't import that, you know, and keep up the finances to keep the Borough going we're out of here so we're down the road anyway and they'll get another Borough in, another council. So they might again take the risk and think that it'll be all right.
Brinsworth 5 (2)

7.5 CONCLUDING REMARKS

The policy issues discussed in this chapter provided points of clear agreement between the focus group participants. Compared to other aspects of the research where there was considerable variation between the case studies, the opinions expressed over, for example, the need for regulation, information rights and the role for land use planning were fairly consistent across the seven different areas. However, on some other issues, such as the question of individual choice there were very different positions and arguments presented. It was quite noticeable how strongly the theme of choice, linked to questions of equity and morality, permeated the discussion of decisions about risk exposure. It was clear that participants were concerned about what was fair and right, as much as, if not more than they were concerned about the probabilities or consequences of accident events. Questions of trust and distrust in regulators and the lack of empowerment typically felt by the group participants also emerged as strong themes. In the next chapter we turn to consider the policy implications arising from these observations, alongside the many others made within this and preceding chapters.
8. POLICY IMPLICATIONS AND CONCLUSIONS

In this chapter we summarise and reflect on the discussion of previous chapters, concentrating particularly on those aspects of the research which have policy implications primarily for the HSE, but also for others involved in the management of major accident hazards. In drawing together what we see as relevant policy implications, we have considered questions of risk perception relating to both general principles of policy and practice, and to recent and forthcoming legislative developments, most notably the Seveso II Directive.

8.1 PUBLIC PERCEPTIONS OF RISK

8.1.1 'The Public'

The term 'the public' is widely used in discussions of risk policy, risk perception and risk communication. It is often used to mean 'non-expert', but there are many different ways in which people outside of the expert risk assessment community can be differentiated. There are many 'publics' of relevance to the management of major accident hazards - the broad 'national' public, activists at local or national levels, councillors who are politically representative of certain publics, members of local liaison panels, the media who are often seen as conveying some sense of public interest and opinion.

In this study we have examined a particular component of 'the public' - residents living within consequence zones and defined as at risk of a major accident hazard on a day-to-day basis. We have also researched so-called 'ordinary' members of the public, not typically making their opinions known through political processes or through access to means of mass communication. 'Local, ordinary, at risk' publics are an important constituency for a number of moral, political and practical reasons. When drawing policy and risk management implications from this study, the position of the particular public that has been researched relative to other groups, and its significance in different policy contexts needs to be carefully considered. It is also necessary in various circumstances to be sensitive to the heterogeneity of the public within particular local communities. Just as risk assessment has to deal with the complexities and uncertainties of different hazardous materials, behaving in different ways, under different conditions and in different environments, so too 'public risk perception' needs to be considered in an appropriately complex and differentiated manner.

8.1.2 Context and diversity

One of the key components of the perspective we have drawn on and developed in this project is the role of context in understanding risk perceptions. In chapters 1 and 2 we discussed the differences between the more abstracted psychometric tradition of risk perception research and the socially-contextualised approach that we have adopted. Whilst the psychometric paradigm has been highly fruitful, it has properties which are unsuited in various respects for the kinds of risk involved in industrial major accident hazards. In particular, the classic psychometric approach examines perceptions of different risks in a way that is utterly stripped of the social contexts in which they are encountered and perceptions formed. This limitation has to an extent been recognised by Paul Slovic, one of the leading exponents of psychometrics, particularly
since his involvement in a project researching a site-specific risk, that of the proposed Yucca Mountain nuclear waste repository in the US. More recent work from Slovic's Decision Research Group has given increasing emphasis to dimensions of social context. Thus the salience of the site-history, of the particular past and present demeanour of the institutional actors involved, and of issues arising directly out of social-relational experiences like stigma which were attributable to the hazardous activity, have leapt into focus whereas with decontextualised representations of risk they were invisible.

We would argue that context is always a central factor in risk perceptions since risks are never defined and experienced in isolation from other issues and questions. Accordingly, in chapters 5 and 6 we outlined the various ways in which the context of the risks presented by major hazard sites shaped and influenced perceptions of the sites, the evidence drawn on, the ways in which people reasoned about risk and the adoption of the different 'points of view' revealed by the Q-method data. We also discussed the various interrelated social and spatial dimensions of context operating at different scales. The 'national' dimensions of context include general political culture reflected in levels of trust and distrust in government and regulation, the dynamics of other high profile risk concerns and the general stigmatisation of chemicals and the chemical industry. 'Local' dimensions of context operate in the particular localities of different major hazard sites, reflecting particular site and community characteristics and the 'personal' context at a more individual level but set within the local context, for example related to particular people's social networks and connections with the major hazard site.

Whilst each of these three dimensions of context are important, we found that local context is particularly significant for the perception of risks from major hazard sites. Influences from the wider cultural context feed into and are refracted through local circumstances. As a spatially focused form of risk, potentially affecting relatively small areas and particular communities, local factors would clearly be expected to be of greater relevance than for other more pervasive forms of risk. In addition, the inherent diversity of major hazard sites in the UK and the range of contexts in which they are set also brings local factors to the fore. Major hazard sites vary considerably in their hazard characteristics. Looking beyond the hazard, they vary even more in their physical, functional and employment characteristics - contrast the vast Fawley complex, and the small LPG installation in Llandudno, the complex chemical processing operations at Albright and Wilson and the treatment of water at Frankley, the smells, noise and nuisance associated with Allied Colloids and the relatively innocuous operations at BOC in Brinsworth. Sites have very different histories in terms of their longevity (137 years at Langley to only 26 years at Llandudno), their changing economic and social significance to local communities and their experience of accident events. They are also set within different physical and social environments - contrast the poverty and social problems of Jarrow with the relative prosperity of parts of the community at Fawley and its proximity to the New Forest; the high level of home ownership at Low Moor with the high level of council renting at Frankley.

The diversity of context for major hazard sites is far greater than for many other site-based risks, which has implications for the tendency in regulatory practice to treat all such risks in an equivalent manner. In this respect, a comparison can usefully be made with nuclear installations with which major hazards are sometimes closely linked. Nuclear installations present a broadly similar risk, constructed in a similar era, as part of a common government-led programme with a common function, with relatively few sources of risk and with similar physical and employment characteristics (with Sellafield standing out as an exception). Nuclear installations also present a risk which all people will be aware of to some
degree, that has a national profile, and implications at a national as well as a local level. In all of these respects major hazard sites show a far greater heterogeneity.

As this research project involved multiple case studies we have been able to take account of and explore the diverse local contexts of major hazard sites. Our case studies displayed the very different ways in which major hazard sites figured in the local area and local senses of place (ranging from occupying central to only marginal positions), and revealed related variations in levels of awareness and concern about the risks from these sites. At Low Moor, for example, the high levels of awareness and concern and the strength of the point of view from the Q-method data we associated with a lack of toleration, were each seen to be related to and exacerbated by the particular circumstances, history and position of the Allied Colloids site in the local area. In contrast, at Brinsworth the much lower levels of concern and strength of the ‘habituated toleration’ perspective in the Q-method data was explicable in terms of the very different local setting and history of the BOC installation.

As well as being central to understanding local risk perceptions, context and diversity also have a number of potentially important policy implications (some of these are discussed in later sections). How contextual differences should be reflected in objective variations in risk-management regimes, and whose responsibility it is to address and if possible change them, is a complex question requiring further consideration and debate between all the relevant parties. But one clear practical implication is that none of the bodies involved can afford to ignore and be insensitive to such contextual realities, including events which may have in official thinking long-since disappeared into the past, or may appear to be unrelated to the immediate risk issues.

8.1.3 Reasoning and rationality

It is now accepted within the risk perception literature that public perceptions of risk cannot be viewed simply as irrational and ill-founded when compared to expert risk assessments (Royal Society 1992). Whilst it would be inappropriate to rehearse here the various perspectives on both public and expert views which justify this assertion, our research has itself demonstrated the reasoned and often well-grounded basis of public perceptions of risks. In chapter 5 we identified the various argumentational repertoires used by people in reasoning about risk, ranging through arguments over choice, trust, morality, trade-offs, probability and consequence and the use of diverse analogies and comparisons. These repertoires were used in complex and varied ways and in total formed a body of discourse about risk which it would be very hard to dismiss as irrational and ill-founded (although it is important to recognise the clear errors of uncontested fact which can occur). Rather, we would argue, it is more constructive to view the basis of public perceptions of major hazard risks as different to that of expert assessments, drawing on different evidence and on different judgements of what are relevant and valid considerations and ways of reasoning. Emotion is also part of the processes involved but as we argued in section 5.5 it would be equally inappropriate to see emotion as simply evidence of distorted perceptions - rather, as psychological research has shown, it is an intrinsic dimension of both cognition and reasoning.

In policy terms, these observations and perspectives call for an approach to the public which seeks to listen to, understand and respect non-expert positions and which is far more realistic about the potential for changing perceptions by simply ‘presenting the expert view’ than is sometimes apparent. This approach is particularly significant for the practice of risk communication that we now move on to discuss.
8.2 RISK COMMUNICATION

Communicating about risk has become over the last decade a key part of the management of risks. From a situation in the mid 1980s where major accident hazards were shrouded in secrecy and there were very few attempts to communicate with publics or encourage dialogue about risks at national or local levels, there is now considerably more openness and active risk communication practice.

Even so many of the people in our study did not feel well informed, saw industry in general and the operators of their particular sites as secretive and not forthcoming with honest information - with any suspicion of secrecy strongly connected to a lack of trust. There was strong support for public rights to information, both in terms of emergency action information and the right to know one is currently or potentially living in an area at risk. Where active communication by site operators had been taking place, this was sometimes well received but also treated with scepticism and doubts over the extent to which companies were being genuinely open.

8.2.1 Local knowledge and ‘informal’ risk communication

Whilst people may not feel well informed about activities at major hazard sites and the risks they present, this does not mean that they are devoid of information and knowledge on which to draw. As stressed in chapter 5, people draw on diverse forms of ‘informal’ risk communication. These include a wide range of immediate day-to-day sensory evidence experienced over long time periods, on information passed through the community from friends and relatives and between generations, and on media reports. As emphasised earlier the diversity of local contexts for major hazard sites means that the nature and content of this informal risk communication varies considerably from site to site. Some sites, for example, provide immediate and powerful sensory messages which are absent at others, such as smell, steam plumes, physical presence (contrast Low Moor and Frankley); some sites are major local employers which results in far more informal communication within the community about on-site activities; some provide evidence of safety through their longevity and good accident record, which others cannot; some have experienced sustained media interest, whilst others have not.

As also stressed in chapter 5, there is rarely a clear compartmentalisation made between the different aspects of the site’s operations and impacts (which may frustrate and confound attempts by risk communicators to focus on one particular aspect), and we found repeated use of analogies in the way that people reason about risks and their management, with linkages drawn between seemingly disconnected activities and issues. As has been identified in ‘effective risk communication’ guidelines, analogies and stories are particularly powerful forms of communication, which, may be open to criticism in technical terms (e.g. BSE and chemical risks are not the same) but which provide telling justifications for more generic concerns and arguments.

These various points in combination lead to the clear conclusion that formal risk communication about major accident hazards does not take place in a vacuum; there is a history, a context, a body of existing knowledge and concerns and a set of pre-existing relationships within which risk communication activities are received and interpreted. This context varies between different major hazard sites and is subject to change over time (c.f. the difference between Low Moor before and after 1992). It is also evident from our
case studies that where active formal risk communication has taken place, it features very little within the range of evidence that people draw on and their reasoning about risks and their management. Formal risk communication also inevitably takes place far more infrequently than the 'messages' received by local people on a day-to-day basis through observation and conversation.

A number of general implications for risk communication policy and practice emerge from this conclusion:

- **formal risk communication for major accident hazards has to be seen as long term and ongoing process**

- **formal risk communication needs to be sensitive to the context within which the major hazard site and the risks it present are set**

- **formal risk communication activities need to recognise and actively engage with the various form of local knowledge relating to the major hazard site.**

Whilst these general points are explored further over following sections, one specific example of practical implications for risk communication can usefully be explored here. This example relates to the sense of disempowerment or control which residents round a hazard site may experience depending upon the ways in which public information provision is organised, especially during and following actual incidents (as have occurred, for example, at both Allied Colloids and Langley). A company suffering an incident on-site may well not know for sure the scale and severity (e.g. whether there are off-site effects or not) until some time has elapsed. Whether to warn surrounding populations immediately, or wait until investigations have been completed, may be a difficult decision. Yet there is pressure on the company to wait until investigation and control measures have determined more reliably the precise significance of the incident and maybe brought it under control - in which case public information bulletins can immediately reassure all concerned as the first information emerges. A strong message that "we have things under control as always" is thus possible.

However, the first official public information about an incident is rarely the first information to reach the public - underlining the general point that publics always have informal sources, however inaccurate and indirect, and always exist in an information-active environment. Thus, for example, after an incident on-site, grapevine news quickly circulates in informal networks via workers home for meals or between shifts, phone-calls, sounds of emergency vehicles being mobilised etc.. Thus people know something is happening but the information blackout, even if temporary, covers a critical period where parents want to decide whether to bring children in from the street or garden, to prepare for something more serious etc.

In the period of uncertainty about the severity of an incident, people want to be informed so that they can decide, if they wish, to be precautionary and not have that decision taken for them presumptively by some remote authority. It may later turn out that there was a minimal risk to the public, but that is less important than their real empowerment at the critical time. During incidents companies' public communication efforts often seem to be directed to local or national media, and possibly also environmental groups, and often have an overriding need to present them with an image of order and control rather than addressing the immediate uncertainties of the local community. Thus the needs and situation of local residents can be subordinated to the need to manage the information flow to more influential actors and to provide reassurance that everything is under control. The tacit assumptions about the real-time
needs of the neighbouring public in such situations need to be critically assessed in context, in view of these kinds of low-visibility conflicts of interests and needs.

8.2.2 Languages of risk communication

It is perhaps self evident that there are substantial differences between the languages used by expert and lay people in talking about risks. Much risk communication literature emphasises the need for ‘experts’ and others involved in major hazard management to avoid the use of technical jargon and terminology in communicating with members of the public (e.g. Sandman et al 1988). Our study has been based around the principle of allowing people to talk about the major hazard site and accident risks in their terms, so that as in all focus groups, the dynamic of the group discussion was allowed as much as possible to flow in an unprompted manner. It was evident that there was a major gulf between the language being used in the focus groups, and that of the expert risk community. In discussing issues of information rights and public participation in the focus groups there was a clear and common expectation that the subject of plant safety was complex, technical and beyond ‘normal peoples’ comprehension and that this was a major impediment to any more involved discussion of safety issues. Furthermore, the group discussions highlighted the fact that it is not just a matter of different vocabularies being used, but also that multiple and divergent frames of reference are employed. This in turn can imply different criteria of rationality within a public context to those accepted within a more technocratic realm.

There is therefore scope for major disparities between the languages of formal and informal risk communications. If there is to be a meaningful engagement and dialogue between expert and lay communities there is a need not only to employ appropriate terms but also, crucially, to be sensitive to different framings of the issues involved.

Alongside this general observation, some further points can be made:

- whilst the majority of people do not use or understand technical terminology, there are within the public exceptions to this ‘rule’; people who through employment, training and education are conversant with more technical and ‘expert’ terminology, concepts and ways of thinking. In our focus groups there was for example a research scientist, an ex tanker-driver, people and relatives of people who had worked at chemical companies, each of whom drew on their ‘expert’ knowledge and experience in participating in discussion. The implication is that risk communicators shouldn’t expect an entirely technically ignorant public and there will be a need for more simple messages to be backed up by more detailed information - referred to as ‘layering’ within the risk communication literature.

- members of the public use a diversity of argumentational repertoires in talking about risk issues. In chapter 6 we identified a series of repertoires used by people living around the case study sites often combined in many different ways. These included arguments about accident consequences, about moral issues, about choice and trade-offs. We also discussed the role of emotion, arguing that it could be an important feature of peoples’ perspectives and that it should not be considered as just distorting perceptions, but rather as an intrinsic dimension of both cognition and reasoning. Developing a better understanding of argumentation and emotion, and recognising the legitimacy of the varied ways in which people approach questions of risk, is important to the goal of enhanced communication between those responsible for risk management and members of the public. In this
respect, it is important to recognise that the different argumentational repertoires we have discussed, as well as representing different forms of argument also represent different framings of the issue at hand. Responding to public concerns framed, for example, in moral terms with a reassurance framed in technical terms, will be unlikely to provide a constructive basis for dialogue.

- much of the traditional focus of risk communication initiatives is to try and explain the concept of probability in the context of publics often characterised as being risk averse, focusing on consequences and not being open to probabilistic arguments. As is clear from discussion in chapters 5 and 7, this characterisation of public views, and thus the risk communication challenge, is overly generalised and simplistic. Many people in the groups were prepared, at least in a hypothetical setting, to engage with probabilistic reasoning, to accept the notion of some accidents being far more likely that others, and to deal in relative, if not statistical terms with different likelihoods or probabilities of risks being realised. It will be clear from our earlier discussion of these issues that probabilistic arguments were neither dominant nor accepted uncritically or unquestioningly. Probabilistic arguments do raise very real tensions and dilemmas for people which are not always easily resolved - for example, the tension between arguing that there is a small chance of a major accident happening, but then also recognising that the small chance could be realised tomorrow, was one which emerged in focus group discussions often without any real resolution. The validity of risk comparisons and the uncertainty of expert assessment of risk also featured in more critical discussion of probability arguments. These observations lend further support for an approach to risk communication which is less about persuading people to accept particular risk statistics or probabilistic arguments, and far more about a dialogue, which amongst other things, can acknowledge the assumptions underlying notions of probability and the legitimate tensions and questions that probabilistic perspectives produce.

8.2.3 CIMAH information

The obligation on CIMAH sites to distribute information to the nearby public has both ‘need to know’ and ‘right to know’ components. This distinguishes between the ‘need to know’ what to do in the event of an accident event (known as ‘shelter in place’ instructions) and the ‘right to know’ certain basic information about the risk that is presented. Five of the case study sites had distributed CIMAH information at varying frequencies since the obligation first came into effect in 1986.

Evidence from the focus group discussions supports the results of other studies which have shown a far from complete pattern of recall and retention of CIMAH information. Factors contributing to the differences in patterns of recall between the case study areas, appear to include both the time elapsed since distribution and population turnover. Other factors such as the general profile of the site in the locality and competing local concerns may also play a role but are difficult, if not impossible, to disentangle in order to establish causality.

We also found people very ready to point out a range of practical problems with emergency action instructions and some scepticism as to their likely effectiveness (see section 7.2.3). One point that appeared to have widespread support among those with some experience of actual incidents is that whereas emergency plans assume standard conditions and complete information on someone’s part about the accident and its unfolding course, these conditions never prevail. Here an effective elaboration would be to explicitly acknowledge the uncertainties that exist and the different circumstances that people may find themselves in
during an emergency (for example, at the bus stop rather than at home). This could enhance the credibility of emergency action information and enable the message that, whatever the circumstances, it is best to 'shelter in place' and monitor local media for further information to be better received.

We also identified a potential problem in the relationship between CIMAH information and other 'public relations' material distributed by site operators. There is a potential for all information distributed by companies being seen as 'PR' (with the negative connotations that this carries), and that this overshadows and obstructs the reception and retention of important risk and emergency action messages in CIMAH literature.

In terms of 'right to know' information about risks, there is little evidence from our case study sites that this is having an impact. At sites where CIMAH information had been given out, we found little awareness of nature of hazardous substances held on-site, and a continued focus on 'big bang' accident events even where the predominant risk described in information leaflets is that of a toxic release. Ironically, the groups at BOC Brinsworth, the site out of all our case studies that had engaged in the least risk communication activity (not being a CIMAH top tier site) were characterised by frequent and accurate references to the hazardous substances held on-site. Here information had been obtained from 'informal' sources of observation and experience, such as the hazard notices on tankers and lorries accessing the site and knowledge of the local steel industry.

The implications of these observations should be considered in the continued evolution and improvement of risk communication practice, and in the development of HSE guidance accompanying the COMAH regulations.

8.2.4 Seveso II, public access to safety reports and 'worst case scenarios'

One of the new requirements of the Seveso II Directive is that safety reports should be made available for public scrutiny (Article 13-4). The commitment to greater openness that this represents is supported by the clear concerns expressed in the focus groups over the secrecy of industrial operations and the general support for rights to information. However it is equally clear that very few of the 'ordinary' members of the public involved in our research will be actively seeking out the contents of safety reports when they first become available. In this sense, the availability of safety reports may serve more of a symbolic rather than a practical purpose for local publics, but become more important in particular circumstances where public attention is aroused by an accident or by development controversy.

It is likely though, that other parts of 'the public', such as environmental groups and the media will more actively seek out safety reports and publicise their contents. Partly for this reason, some companies are looking to the US experience of actively communicating about 'worst-case scenarios' through extensive programmes of information provision and dialogue with communities at risk - as undertaken for example at Kanawha Valley - and considering whether to proactively adopt such approaches in advance of the implementation of the Seveso II Directive requirements.

We can reflect on the adoption of similar risk communication initiatives, in the light of our research:
• **there is already some expectation of worst-case events within communities at risk.** There was continued reference across the case studies to sites having the potential to destroy large areas in a sudden dramatic accident event. This evidence may be taken on the one hand to suggest that the presentation of ‘worst case scenarios’ will create little surprise or anxiety - indeed it may serve to reassure through acknowledgement that the worst is being recognised and that steps are being taken to prevent it from happening. On the other hand, the actual worst case scenarios for particular sites may bear little relation to local expectations of a ‘big bang’ (for example where toxic releases are involved). Furthermore, if worst case scenarios extend beyond existing consultation or emergency planning zones, this may raise questions about the appropriateness of management provisions and may also extend risk concerns to populations with no current perception of being ‘at risk’.

• in the planning decision-making discussions in the second round of each focus group, we presented participants with simple accident scenarios. We have also distinguished between smaller ‘more likely’ accident scenarios and those which are ‘very unlikely’ to happen for a number of reasons. *This experience of presenting accident scenarios suggests that most people are willing and able to engage with the notion of accident scenarios and the different likelihoods with which these might occur.* Whilst this provides some useful experience on how to draw, it is important to recognise that there may well be differences in the responses made to the hypothetical scenarios used in our focus group discussions and scenarios presented for real sites in real locations - and also to scenarios presented by site operators rather than university researchers.

• **a willingness on the part of the public to engage with the notion of accident scenarios does not mean their uncritical acceptance.** From our experience of focus group discussions, any processes of active dialogue and discussion of worst-case scenarios, safety measures and risk management with members of ordinary public will raise a range of concerns, questions and challenges. These will draw, as discussed in chapter 5, from a range of sources of evidence and reflect different ways of reasoning about risks. Examples of the types of questions raised in the focus groups include:

  - how do you know that accident impacts will be limited to the areas shown?
  - even if the likelihood of a major accident is low, it can still happen tomorrow
  - worst case accidents have happened in other places
  - how can you predict human error?
  - how about the aeroplanes that fly over the site, or the threat of a terrorist attack?
  - how well will emergency response plans really work?
  - how do we know that profits aren’t put before safety?
  - companies always know when HSE inspectors are coming round so how can they really know how well run the plant is?

• in a two-way setting the agenda for members of the public may be different from that of risk communicators; for example, not separating accident risk from other forms of risk.

• **any process seriously trying to engage with significant numbers of the ‘local, ordinary, at risk public’ is likely to have a real challenge in achieving effective two-way communication.** Many people are distrustful of any form of ‘official’ communication, feel disempowered and lack confidence in their ability to understand, let alone contribute to discussion of what may be seen as complex, technical matters.
8.2.5 HSE involvement in local risk communication

As discussed in section 7.3.3, the HSE role in hazard regulation is recognised to an extent amongst the members of the public involved in the research and was evaluated more in a positive than a negative manner. On the other hand, the Q-method data in chapter 6 suggested that toleration of risks based on confidence in the HSE, was not a widespread viewpoint and did not feature in all of the case study areas. Key criteria used by participants to evaluate the HSE were identified as independence from government and industry, the degree of proactivity, the effectiveness of inspection practice and level of expertise.

Differences of opinion were quite marked for each of these criteria with some strongly negative views expressed. In making judgements about the HSE we found that people drew heavily on their own workplace experience. These evaluations and criteria have implications for the extent and manner of any greater HSE involvement in local risk communication activities with the general public and their political representatives. In general they suggest that the nature of regulation should be given a higher profile in public communications. More specifically, and in relation to particular areas of expressed public concern, the following points can be made:

- activities where the HSE could be seen as being too closely linked with industry may detract from perceptions of the HSE’s independence. This in turn could lead to a more negative views of their regulatory performance.

- the HSE needs to be able to explain and defend inspection practices, particularly in relation to the issue of prior notice. However, evaluations made by members of the public of an indicator such as inspection frequency is unlikely to be unambiguous and would need to be carefully considered.

- the specialisation represented by the formation of the Chemical and Hazardous Installations Division within the HSE should be emphasised in any communication initiatives, alongside explanations of the differences between the type of inspection and scrutiny carried out at major hazard sites and the practice of local authority and HSE regulation and enforcement at other workplaces.

8.2.6 Risk communication and residential choice

Information rights relating to the making of residential choices were raised across many of the groups. Whilst there was much disagreement about the constraints on peoples choices, there was more general agreement that people were not well informed when making decisions about where to live. Many people pointed to the difficulties involved in ‘informing yourself’, including that builders would not advertise the fact that new houses were in consequence zones, that CIMAH leaflets would not be shown to prospective house buyers by current occupants or estate agents, and that is was very difficult for ‘non-experts’ to appreciate which factories were hazardous and which were not.

The identification of this issue suggests the need for further research on this specific topic, and also raises potential policy implications regarding the timing of information provision.
8.3 LAND USE PLANNING ISSUES AND RISK CRITERIA

Land use planning control over both the locations of hazardous sites and development in their vicinity potentially plays a mitigating role in the control of major accident hazards. It has long featured in the portfolio of controls applied in the UK (predating the Flixborough accident) and rather belatedly has now appeared as a new addition to European legislation. As discussed in chapter 7, in a range of ways discussion in the focus groups clearly displayed the relevance and salience of planning control to members of the public, supporting its key place in the current control regime and its inclusion within the Seveso II Directive.

The only challenges made to the need for planning control arose in the planning scenario discussions. Where decisions over the siting of housing developments in the vicinity of an existing plant were being considered a small number of people across the groups argued that no development restraint should be applied, but that it should be left to individuals to decide whether or not to live in any new housing that was constructed. This reliance on personal choice was very much a minority position, and was rejected by others on a range of grounds (see discussion in section 7.4.4.7)

Through the use of planning scenarios as part of the research design we are able to point to implications for a number of the principles of and criteria for land use planning decision-making currently in place.

8.3.1 Local decision-making

There has been a long standing debate over whether the HSE or local planning authorities should have the final say over planning decisions with major accident hazard implications. The policy position is that the HSE provides expert advice on the significance of risks, with the local planning authority then balancing this advice against other local planning matters in coming to a decision. Three aspects of our research findings can be seen to have implications bearing on this issue, the first two supporting the principle of local decision making, the third maybe not:

- the importance of local context in the way that people relate to and perceive the risks from major hazard sites

- the willingness of the majority of participants to compromise between public protection and other local needs in responding to the first of the planning scenarios (although there was also a substantial minority position unprepared to compromise on public safety). Whilst it must be remembered that the scenarios presented simplified and hypothetical situations, the responses discussed in chapter 7 indicate that there is a reasonable level of support for the principle of balancing between the need for development and hazard potential.

- the cynicism and doubts expressed in many groups about the motivations and probity of those making planning decisions. Where comments about planning decision-making in practice were made these saw planning as protecting the interests of business, of companies and private house builders, rather than the safety of local people (see section 7.4.2 and others). This observation in its own right suggests the need for local planning authorities to build a greater degree of trust in the capacity of the planning system to enhance public safety.
8.3.2 Intervening development

An issue sometimes raised in policy discussions over the recommended restraint of development around major hazard sites is that of intervening development - should the fact that there is already residential development in an area at risk affect decisions made over new development proposals? The HSE policy position is that the advice it gives should not be affected by the existence of intervening development.

In the first of the planning scenarios participants were presented with a situation in which the need for development restraint was considered in an area that already had a significant residential population living around a long established chemical plant. The fact that housing development already existed was raised in scenario discussions, with some concern expressed over the different standards of safety being applied to existing and new populations. However, very few of the participants used it as the main justification for not applying development restraint (an option that few people advocated in any case). Rather there were frequent comments regarding the need to not let the current situation get any worse and to not repeat past planning mistakes.

8.3.3 Societal risk

There has been much recent debate about the extent to which, and manner in which, ‘societal’ as opposed to ‘individual’ risk should figure in decisions about the tolerability of risk. Distinctions in this debate have been drawn between ‘societal concern’ - an indicator of the broader social and economic consequences that can follow from major accident events - and ‘group risk’ the greater significance that is accorded to a large number of deaths happening at the same time. From our research we can make the following points regarding the relevance of societal risk to major accident hazards:

- the predominant expectation is of a sudden and highly destructive event. It follows from this that the risk is seen as very much a collective rather than an individual one - people all ‘going together’ rather than being able to differentiate their vulnerability or risk from those of others in the area. This seems to indicate a fundamental feeling of lack of control, that if anything happens there will be nothing to prevent the worst, and certainly no way in which residents could influence the situation.

- as discussed in section 7.4.5, responses to the second planning scenario provide evidence of participants attaching considerable significance to the numbers of people affected by an accident event.

- of our case study sites, Allied Colloids had experienced the most substantial recent accident event. The ‘societal impact’ of this accident which in technical terms was relatively insignificant (there were no deaths and only short term impacts on the local environment), provides clear evidence of the ‘societal concern’ that can be realised from major accident hazards. The stigmatisation of the Low Moor area and the perceived economic effects and raised levels of concern and anxiety arising from this were keenly felt by the participants in the research, even 5 years after the accident had taken place. Although a combination of historical and contextual factors have contributed to the resentment towards Allied Colloids now felt by many members of the Low Moor community, the 1992 accident undoubtedly played the major part in creating a clear sense of stigmatisation.
8.3.4 Vulnerability criteria

In providing advice to local planning authorities on development proposals near to major hazard sites MHAU identifies different categories of vulnerability or 'sensitivity' for different types of development, reflecting both the type and numbers of people likely to be at risk at the proposed development. Using these vulnerability categories, greater protection through separation from the source of hazard would, for example, be advised for a school rather than a factory. The planning scenarios discussed in chapter 7 did not explicitly address the use of such vulnerability criteria in land use decisions and for this reason it is not possible to provide strong conclusions in this area. However, a number of relevant observations from the discussion that took place can be made.

At various points in the groups there were clear expressions of concern over risks to children. This was a strong theme, for example, in the discussion of health risks related to air quality. In relation to accident risks, particular concerns were expressed at Llandudno and to a lesser extent at Fawley about the proximity of schools to major hazard sites, and at Low Moor over the risks to schoolchildren visiting a nearby transport museum and to children standing and watching the fire in 1992. These concerns would lend support to policies differentiating schools and other facilities for children from other types of development - particularly when linked to the conclusions regarding societal risk discussed above. During the planning scenario discussions a few people suggested (without any prompting) that it was acceptable to allow industry and warehousing to be built closer to major hazard sites than housing, which also closely follows the reasoning currently applied by MHAU.

Looking more broadly at the themes of discussion emerging from the planning scenarios, the question of choice and residential location potentially raises issues of relevance to the categorisation of different types of development by MHAU. The distinction in this respect between home owners (if they are informed about risks) and council tenants allocated housing and having less choice about where they live could be argued to be a relevant consideration in the evaluations made of different types of housing proposals and different types of development more generally.

8.3.5 Risks to the environment

The main focus of attention in major hazard control has until recently been on risks to humans, with environmental impacts only being considered more substantially as a result of the 'Seveso' and now COMAH Directives. Across the focus groups there was a similar strong emphasis on human health and safety and very little discussion of actual or potential impacts on the environment. Even at Fawley, where the petrochemical complex was in close proximity to the New Forest and protected coastal environments, there was little discussion of potential environmental impacts.

8.4 EMERGENCY PLANNING AND RESPONSE

Emergency planning did not figure significantly in the focus group discussions. Where it did, it was either in discussion of emergency responses made to actual accident events (see section 5.3.2) or as part of the hypothetical accident scenarios in the second round of focus groups. This low profile in discussion suggest a low profile in peoples perceptions. It could also reflect the focus on sudden 'big bang' events with little or no possibility for protective actions, the difficulty people have in putting themselves in the position of planners of any sort and the
discomfort we noted that people experienced in talking about what the real consequences of a major accident could involve. A few points with potential policy implications can though be drawn out:

- discussion of the emergency response during accident events was rarely positive and sometimes very critical of what was going on

- the limited recall and retention of CIMAH information, together with scepticism about the emergency action advice, is unlikely to assist the smooth functioning of emergency plans in real situations

- the COMAH Directive (Article 11-3) requires public consultation on emergency plans. Whilst, as already noted, it may be difficult to achieve effective and widespread local public engagement with any consultative process, this could help build a higher profile for and level of confidence in emergency planning, and potentially achieve useful inputs into the plan-making process.

8.5 THE TOLERABILITY AND TOLERATION OF RISK

Three decades of risk perception research have clearly established that members of the public do not think about sources of risk solely or even substantially in terms of statistical probabilities. It follows that any search for a quantified index of what ‘the public’ (however that is defined) deems to be a statistically acceptable or tolerable level of risk is futile. As we have also argued and shown, there is a considerable difference between asking people to think about risk in abstract terms and asking them to think about a real risk, in a real location and at a particular point in time. When confronted with a risk in context, people draw on a wide range of resources drawn from their own experience and the ‘information’ they encounter on a day-to-day basis; when asked to think about risk in a more abstract sense (as they were with the hypothetical planning scenarios) we found that people did all they could to relate the hypothetical to the real context within which they themselves lived. This immediately highlights a tension between the ‘toleration’ of a contextualised local risk and the more abstract notion of ‘tolerability’ developed within the HSE ‘Tolerability of Risk’ (TOR) framework and surrounding policy discussion (this tension is explored more fully in later discussion).

As we have discussed at several points, the extent to which members of the public have fixed or certain opinions on questions of risk at all, is also open to question. In the focus group discussions people could be seen to be trying out different positions, deploying different and often contradictory lines of argument and weighing up different considerations against each other as their discussion developed.

This all clearly serves to complicate the task of drawing conclusions regarding questions of tolerability. In the light of our research findings we can nevertheless make a number of observations about the implications of public perceptions of risk for recent policy statements and discussion. One relevant observation at this point, is that the relationship of the quantified thresholds of TOR to contextual risk perceptions, is not simply that of objectified risk to subjective perceptions. Quantitative risk assessments, let alone normative magnitudes like TOR criteria, contain subjective and contingent assumptions; and, as we have discussed, local contextual risk perceptions are often based on objective local factors. This has to be recognised before progress can be made in this domain.
Such recognition would allow the possibility of treating quantified evaluations and criteria as useful artefacts rather than unconditional representative truths, and of thus ‘layering’ numerical standards with various more qualitatively derived representations of other factors of the sort identified in risk perceptions research. Thus a standard TOR criterion could be qualified at a given site in the light of context, for example a bad past record of near-misses, or high degree of stigma, or a potentially inequitable risk-distribution. Such qualification could be explicitly artificial and approximate, a way of encouraging wider debate and negotiation about the ways of improving these conditions locally, to the benefit of risk management. Further implications are drawn out over following sections.

8.5.1 Characteristics of risk and context

In many of the various policy discussions of risk a familiar list of ‘risk characteristics’ (familiarity, choice etc.) which are seen as influencing public perceptions of risk, are discussed. Many of these characteristics featured in the focus group discussions about the sites and the major accident hazards they presented. Two key points, however, need to be made about these characteristics:

- it is not only characteristics attributed to the risk that are relevant; characteristics of the context of the risk are also important. As we have shown, although some contextual features may be characteristic of the wider national culture, many others vary considerably between different sites and localities and between different communities at risk.

- the definition, assignment and implications of the various risk characteristics are not straightforward, and may be conditional on a number of contextual considerations

These points can be exemplified by a consideration of how a number of key characteristics featured in the way in which the participants in our research perceived sources of major accident hazard:

- familiarity: the notion of familiarity can be considered in a number of different ways. On the one hand there is generally little public familiarity with the risk producing substances and technologies involved at major hazard sites - processes within chemical plants are seen as complex and requiring a specialist expertise to understand (although for workers and ex workers at hazardous sites this may be less characteristic and there is more generally more familiarity with substances such as LPG which are encountered in a range of settings). On the other hand, for people living near to major hazard sites, these are intensely familiar features of the local landscape and everyday life. As discussed in chapters 6 and 7, this day-to-day familiarity may result in an habituated and stoic ‘getting on with life’ with little evidence of concern, or lead to heightened anxiety at the continual presence of a resented source of risk.

- choice: whilst the risk from major accident hazards is in one sense externally imposed on members of the public, we found very different views about the ability of individuals to exercise choice over being exposed to that risk. It was also not simply a question of an individuals own ability to choose where they lived; other people’s capacity to exercise choice depending upon socio-economic circumstances could be just as important in the

\[\text{1 see Porter (1995), Funтовicz and Ravetz (1990).}\]
evaluations made, bringing in wider questions of fairness and equity. Furthermore, even where people recognised that they could, in principle, exercise a choice about residential location, it did not follow that they were willing to exercise that choice or that they agreed that it was right to expect people to do so. In this sense it is difficult to identify choice as a uniform and clearly defined ‘variable’, it is rather differentiated and in some respects conditional on questions of equity and morality.

- **benefits**: a close link between perceptions of risk and the perceptions of benefits from the risk producing activity is often assumed, with greater perceived benefits leading to a higher level of risk toleration. As discussed in chapter 5 we found very different levels of recognition of benefits from major hazard sites, and different weights accorded to benefits when considered as trade-offs against possible risks. Where benefits were recognised, local benefits received far more emphasis than societal ones. The analysis of Q-method data indicated that economic trade-off arguments for toleration only figured in localities where the site was a major local employer. However, it also suggested that trade-off arguments tend to be made where there is a related sense of empowerment to take action. For many other people, economic benefits did not figure prominently in their reasons for tolerating the presence of their local major hazard site.

- **catastrophic risk**: there was a widespread belief in the groups that major hazard sites could have catastrophic consequences. However, this did not necessarily imply a heightened level of concern. In the focus groups, discussion of catastrophic consequences was sometimes linked to expressions of anxiety, but such discussion also supported fatalistic arguments, on the grounds that there was little the individual could do to protect themselves, and probabilistic reasoning which recognised the potential for a ‘big bang’ but then acknowledged that such events were very unlikely to happen.

What this discussion of a number of characteristics displays is the need for some caution in both assuming that the definitions of these characteristics are held in common, and that relationships between variables derived from research taking place at an abstract level (not dealing with specific risks in real places) can be meaningfully transferred to more contextualised settings.

### 8.5.2 Tolerability and toleration

The term ‘tolerability’, developed within the evolving TOR framework, refers essentially to an abstract concept. The framework is seeking to apply universal or society-wide criteria and principles to the making of decisions about risk. In this setting agency is artificially given to an abstract principle, which allows policy to be framed in terms of societal costs and benefits and an abstract quantitative criterion is applied as a basis for policy decisions. The public is standardised throughout as the risk tolerator. We would argue that ‘toleration’ in contrast is about the real, local and contextualised responses to specific risks. This differentiates rather than standardises the public through giving agency to the public in all its various contextual encounters with risks, their agents, associated actions, intentions and meanings. For these reasons, it is not a straightforward matter to move from toleration to tolerability - from the contextual to the abstract - in order to draw conclusions of direct applicability to the TOR framework. This is a tension which can be identified in the 1992 TOR document which perhaps too readily shifts from discussion of universal risk criteria, to statements about how these relate to public views and attitudes.
Focusing for the moment on the ‘toleration’ we have observed amongst people living near to the case study major hazard sites, at a superficial level at none of the sites are people ‘up in arms’ and pursuing active campaigns to get the risk removed; and only really at Low Moor did any people talk about trying to move out of the area because of the risks the site presents. Although across the case studies there was a small minority of people expressing a strong desire to see their local site shut down, it is reasonable to conclude that there is, in general, realism and resilience in the face of risk and uncertainties.

This day-to-day living with risk is not though accompanied by a high level of trust in the operators of hazardous plants to control risks and prevent accidents from happening - the widespread agreement with the need for strong regulation clearly demonstrated a scepticism about the commitment to industrial safety.

Neither can we conclude that this living with risk is universally based upon the active recognition of benefits and confidence in control measures that the commonly accepted definition of tolerability implies:

‘a willingness to live with a risk so as to secure certain benefits and in the confidence that it is being properly controlled’ (HSE 1992, para 10, p2)

Rather we would argue that this ‘willingness’ does not necessarily exist and where it does is not necessarily based upon a combination of benefits and confidence in control. Particularly significant is the lack of any utilitarian sense of needing to tolerate risks for the greater good of society, which, because it is operating essentially at a societal level, provides the focus of the TOR rationale. Furthermore, rather than an active ‘willingness’ it would be more appropriate to characterise many peoples perspective as ‘putting up with’, ‘being resigned to’ and ‘trying not to think about’. More specifically in the Q-method analysis we identified a number of different ‘points of view’, each based upon a combination of factors, which exist across the at risk publics:

- lack of toleration based on vulnerability, powerlessness and distrust
- toleration based on trust in the company
- toleration based on habituation
- toleration based on trade-offs and collective agency
- toleration based on faith in authorities
- toleration based on individual agency and choice

The first of these six points of view, characterised by a lack of toleration and anxiety about risks, emerged as the strongest at most sites. It is particularly noticeable here that only one ‘intolerant’ perspective emerged, which although consisting of a number of different themes of argument, suggests a reasonably common and resonating set of concerns. In contrast, a ‘tolerant’ perspective was at many sites less widely expressed and was far more differentiated, with five different points of view identified. As discussed in chapter 6, a range of contextual factors contributed to a stronger sense of toleration at some sites than at others. For example, toleration based on trust in the company tended to be associated with people having employment links to the company, whether their own or that of family members. Similarly a habituated toleration was more evident where the site had a generally low profile or where it was closely linked to the development and identity of the area. The categorisations that emerged from the Q-analysis reflected the range and balance of positions encountered in the focus group discussions. Whereas the focus groups displayed more of the uncertainty and fluidity of people’s views and arguments, Q-method enabled us to identify some of the ways in
which the contextual factors and varied repertoires of argumentation combined to produce patterns that recurred across different contexts.

Although we framed our discussion of these patterns in terms of toleration of risk, we might just as effectively have considered them primarily in terms of trust and agency. The issues of public trust in institutions and organisations and of the extent to which members of the public felt themselves able to influence the circumstances that shaped their lives pervaded our analysis of both the focus group and the Q-method data. In this respect our research provides further evidence of the major part played by social trust in shaping risk perceptions, as well as emphasising the contextualised nature of the relationships, both direct and mediated, that form the basis for trust and distrust in companies and regulatory bodies.

Whilst the prevalence and bases of public toleration of risks are important to risk management, the stability of different points of view is also significant. Our analysis suggests that the ‘intolerant’ viewpoint is likely to be relatively stable and difficult to change because it is based on a cluster of strong, mutually reinforcing sentiments. In contrast, some bases of toleration appear more locally contingent and therefore less stable. For example, a decline in local economic benefits or a badly handled incident may undermine the condition on which toleration is based. This observation, together with the emphasis that we have given to the contextual influences on public risk perceptions, is unlikely to be a welcome conclusion for those involved in risk management. It indicates that the task of managing major accident hazards will continue to be politically and socially difficult and that the context and practice of site management, hazard regulation and risk communication will continue to present an evolving set of challenges, particularly where local sensitivities to risk are aroused.
ACKNOWLEDGEMENTS

A project of this nature can never be the product simply of those who author the report. We would therefore like to acknowledge those who have also contributed in very practical ways to its successful completion. To begin with we would like to express our gratitude to the HSE for funding this research. We are also particularly grateful to our project officer, Ann Brazier of the HSE Chemicals and Hazardous Installations Division (CHID), and to Chris Kelly of the HSE’s Health and Safety Laboratory for their constant encouragement and support during the course of the project. We would also like to extend our thanks to the following people:

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APPENDIX 1: FOCUS GROUP DISCUSSION GUIDE

Focus group discussion guide for meeting 1.

1. Brief introduction from the facilitator.
   Welcome everyone and thank them for attending.
   Introduce ourselves: social researchers, university-based, public funding.
   Want to talk about living in this area: general impressions then some specific aspects
   This not a test - no right or wrong answers - just want to hear their views about things.
   Explain re tape recording: listen better/better record of what people say
   Assure their anonymity in any use that is made of the material - so speak freely
   Speak one at a time. Defer any questions until the end.

2. Local context/sense of place
   Ask participants to introduce themselves and say how long they have lived in the area, whether
   have family/friends here or they work locally (strength of roots/identification)

   Identify one good and one bad thing about living in the area.

   Use the list and probe questions to explore:
   What kind of image the area has (probe for tensions, eg rural-industrial, and changes)
   How they 'map' and divide up the area (probe views of local natural environment)
   What problems they see the area as having and what would mitigate/solve them
   What they perceive to be the economic situation of the area (employment, businesses)
   How they perceive local business and industry - relationship with the community
   Attitudes towards local authorities and other governmental bodies
   Is there any sense of stigma associated with specific local problems/activities?

3. Local risks
   If risk issues have not already been raised, introduce by linking to earlier concerns:
   What kind of risks do they perceive to exist in the local area and how serious are they?
   What do they know about these risks and where do they find their information?

   Use probe questions to explore:
   Awareness of and concerns about risks associated with major hazard industry
   Look out for blurring of 'boundaries' between issues (packaging)
   Types of hazard event considered possible at major hazard sites
   Sources of information on major hazards, including CIMA information
   Estimates of the likelihood of accident events occurring
   Comparisons with other types of risks - are they made? - are they relevant?
   The tolerability of risks in general and in particular for major hazards
   Importance of previous history (inc accidents/prosecutions) for current evaluations
   Who is responsible? Awareness of those involved in local risk management
   Trust in those involved in local risk management
   How much influence they feel they have/dependency on others/powerlessness

4. Explain and demonstrate Q-sorting exercise and return arrangements

5. Close: confirm date and time of next meeting
APPENDIX 2: Q-METHOD MATERIALS

INSTRUCTIONS FOR PARTICIPANTS

These are the materials for the second sorting exercise. As I explained at the meeting, the statements in this exercise are all about the benefits and risks associated with industry. The statements have come from a lot of different places but to make them relevant to your area we have put the name of [COMPANY NAME] in some of them. As they are intended for use in several different areas, you may find that some statements are less relevant than others are.

Enclosed in this envelope you should find the following:

- A sheet headed 'Sorting Grid'
- An envelope containing a set of statements printed on small cards. It also contains a set of numbered markers (going from -4 to +4).
- A Comments Booklet, which contains a list of all the statements
- A short questionnaire headed 'Participants Details'
- A stamped addressed envelope to return the materials to us

You should have completed the first exercise, which we gave you at the meeting, before you do the one in this envelope. It is important that the same person should complete both of the exercises. You should complete this exercise in exactly the same way as the first. The instructions are repeated below to help you.

Doing the sorting exercise

As you will remember from the demonstration, you need to give yourself plenty of space to lay out the statements. It is a little like playing the card game Patience. If you use the floor, try to avoid doing it at a time or in a room where other people or pets will walk over it and disturb your arrangement.

STEP 1: Begin by taking the statements and numbered markers out of their envelope. Across the top of the table or space where you will be sorting the statements, place the numbered markers in a line like this:

-4  -3  -2  -1   0   +1  +2   +3   +4

You will see that at the bottom of each marker is a number in brackets. This tells you how many statements there should be under that marker when you have finished sorting the statements.

STEP 2: First of all, sort the statements into three piles as shown here:

Statements I generally disagree with Statements I feel undecided or uncertain about, or which seem unimportant to me
Statements I generally agree with
**STEP 3:** What you have to do now is to arrange the statements beneath the markers, from those you disagree with most strongly (-4) to those you agree with most strongly (+4). Take a look at the Sorting Grid that is enclosed to remind yourself what the final pattern of statements should look like. The best way to do this is to work on each of your three piles separately. Leave the middle pile until last. From the pile of 'agree' statements, choose the two with which you agree most strongly. Place those beneath the marker numbered +4. Work your way through the rest of the 'agree' pile, placing statements beneath the markers according to how strongly you agree with them. Sort the 'disagree' pile in the same way, beginning with the statements with which you most disagree which you should place on the left, beneath the marker numbered -4. Finally, arrange the statements from the 'undecided' pile beneath the markers in the middle. You can move the statements around as much as you like while you decide which order they should go in. Shuffle statements around until you feel happy with the overall pattern.

One thing to bear in mind is that the numbers on the markers are only meant as a guide; it is the order in which you place the statements that is important. So it does not matter if you feel that you have more 'agrees' than 'disagrees' (or vice versa). It is the overall pattern that matters. **Please be sure to keep to the pattern on the grid. Do not draw extra boxes to make any of the columns longer.** If you wish, you can mark or annotate the grid to show where your 'agrees' and 'disagrees' begin and end.

The other thing to bear in mind is that the sorting exercise is intended to find patterns in the way people arrange the statements. So you should not spend too long thinking about your choices - for example, which statement to put in +3 and which one in +4. We want you to think carefully about where you place the statements but we do not want you to get bogged down or take up too much of your time. So please do settle for what seems to you to be a reasonable estimate, and leave it at that.

**STEP 4:** If you find that you have difficulty deciding about where to put a particular statement or you find it hard to distinguish between one and another, write a short note next to the statement in the 'Comments booklet'. You can also use the booklet to explain why you feel strongly about a particular statement or to write any other comments you may have. These additional comments are extremely useful for helping us to understand why you have sorted the statements in a particular way, so any comments that you have time to write will be very welcome.

**STEP 5:** When you have finished sorting the statements, they should be arranged in the same pattern as on the 'Sorting Grid' sheet. The last thing that you need to do is to complete the 'Sorting Grid' by writing in the numbers of the statements as you have positioned them. For example, if you chose statements 7, 19 and 33 for the +4 positions in your sort, then enter 7, 19 and 33 in the spaces under +4 on the grid. **Please make sure that you follow the grid exactly.** If you do not, the computer programme that we use will not accept the information and the time that you have spent sorting the statements will be wasted.

Finally you should complete the 'Participant's Details' form. This is to help us when we come to look at the patterns that emerge from all of the sorting exercises that people complete. You will not, of course, be identified in any reports that we write.
Returning the materials

When you have finished, please make sure that you have:

- Completed the Sorting Grid;
- Written any comments you have about the statements in the Comments booklet; and
- Completed the Participant's Details form
- Put your name on the sheets that you have written on

Once you have checked that everything is completed, put all of the materials back in the large stamped addressed envelope and return it to us by [DATE].

Thank you again for taking the time to help us with this study. When we see you at the next meeting we will be glad to hear any comments that you may have about the sorting exercise or about the statements themselves. We look forward to seeing you then.
### Q-SORT STATEMENTS

<table>
<thead>
<tr>
<th>1. I never worry about <code>&lt;COMPANY NAME&gt;</code> - it's just part of everyday life around here</th>
<th>2. It would be a terrible loss to the area if <code>&lt;COMPANY NAME&gt;</code> was to close down</th>
<th>3. I worry that there are probably an awful lot of risks from <code>&lt;COMPANY NAME&gt;</code> that we don't know about</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. We can rely on the Health and Safety Executive to make sure that chemical companies do not put the public at risk</td>
<td>5. Companies will always put profits before safety</td>
<td>6. The people running <code>&lt;COMPANY NAME&gt;</code> know what they're doing - they wouldn't work there if it was that dangerous</td>
</tr>
<tr>
<td>7. The local media always exaggerate and misreport the tiniest little accident</td>
<td>8. What worries me about <code>&lt;COMPANY NAME&gt;</code> is what gets out of there into the local environment</td>
<td>9. If <code>&lt;COMPANY NAME&gt;</code> went up half of the area would go with it</td>
</tr>
<tr>
<td>10. The chemicals that they make now are a lot more dangerous than they were fifty years ago</td>
<td>11. If the experts say that <code>&lt;COMPANY NAME&gt;</code> is safe enough, that's good enough for me</td>
<td>12. A lot of people around here are worried about an accident happening at <code>&lt;COMPANY NAME&gt;</code> but they don't always talk about it</td>
</tr>
<tr>
<td>13. We don't have a choice about living with the risk of an industrial accident - it's out of our hands</td>
<td>14. No-one will do too much about any dangers from <code>&lt;COMPANY NAME&gt;</code> in case it puts jobs at risk</td>
<td>15. This area is as safe a place as any to live</td>
</tr>
<tr>
<td>16. The information that <code>&lt;COMPANY NAME&gt;</code> puts out is all PR - they just tell you what they want you to know</td>
<td>17. The chemical industry is just a threat to everyone's health and safety</td>
<td>18. The local newspapers and TV are the only way we find out the truth about what goes on at <code>&lt;COMPANY NAME&gt;</code></td>
</tr>
<tr>
<td>19. The general public aren't capable of making judgements about the risks from chemical companies</td>
<td>20. If enough local people expressed concern about safety, <code>&lt;COMPANY NAME&gt;</code> would have to do something about it</td>
<td>21. I would know what to do to protect myself if there was a big accident at <code>&lt;COMPANY NAME&gt;</code></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td><strong>22.</strong> There’s not much chance of an accident at <em>&lt;COMPANY NAME&gt;</em> that would harm local residents</td>
<td><strong>23.</strong> Whatever they say, accidents will happen - dangerous chemicals can never be made 100% safe</td>
<td><strong>24.</strong> There are more dangers from things we do in everyday life than there are from <em>&lt;COMPANY NAME&gt;</em></td>
</tr>
<tr>
<td><strong>25.</strong> The safety of local people is a top priority for <em>&lt;COMPANY NAME&gt;</em></td>
<td><strong>26.</strong> The most reliable place to go for information about the safety of <em>&lt;COMPANY NAME&gt;</em> operations is the company itself</td>
<td><strong>27.</strong> The economic benefits that <em>&lt;COMPANY NAME&gt;</em> brings to the area far outweigh any danger to the public</td>
</tr>
<tr>
<td><strong>28.</strong> There’s no point worrying about an accident happening at <em>&lt;COMPANY NAME&gt;</em> - we’ve all got to go one day</td>
<td><strong>29.</strong> The companies in <em>&lt;COMPANY NAME&gt;</em> take care to protect the local environment</td>
<td><strong>30.</strong> I worry about the smell from <em>&lt;COMPANY NAME&gt;</em> - it must be bad for your health</td>
</tr>
<tr>
<td><strong>31.</strong> Chemicals are essential to modern life - so we have to put up with the risks</td>
<td><strong>32.</strong> No-one forces people to live here - if they think it’s too dangerous they can always move out</td>
<td><strong>33.</strong> The chemical industry is committed to protect the public and the environment</td>
</tr>
<tr>
<td><strong>34.</strong> Having <em>&lt;COMPANY NAME&gt;</em> around here gives the area a bad image</td>
<td><strong>35.</strong> You can’t rely on the experts to be sure that industry is safe - just look at how much they disagree</td>
<td><strong>36.</strong> A disaster like the Bhopal accident in India could never happen in this country</td>
</tr>
<tr>
<td><strong>37.</strong> As technology progresses, the risks from the chemical industry are being reduced all the time</td>
<td><strong>38.</strong> People's worries about the chemical industry tend to be very irrational</td>
<td><strong>39.</strong> I don’t think that the emergency services could do much to protect us if a major accident happened at <em>&lt;COMPANY NAME&gt;</em></td>
</tr>
<tr>
<td><strong>40.</strong> I don’t think that <em>&lt;COMPANY NAME&gt;</em> has any harmful effects on local people’s health</td>
<td><strong>41.</strong> The Council’s planning system is more geared to helping business than to making sure that local residents are safe</td>
<td><strong>42.</strong> I wouldn’t trust anything that the management at <em>&lt;COMPANY NAME&gt;</em> said about safety</td>
</tr>
</tbody>
</table>
# ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>CD</td>
<td>Consultation distance (specified for land use planning purposes)</td>
</tr>
<tr>
<td>CHID</td>
<td>Chemicals and Hazardous Installations Division of the HSE</td>
</tr>
<tr>
<td>CIA</td>
<td>Chemical Industries Association</td>
</tr>
<tr>
<td>CIMAH</td>
<td>Control of Industrial Major Accident Hazards Regulations 1984</td>
</tr>
<tr>
<td>COMAH</td>
<td>Control of Major Accident Hazards Regulations (forthcoming)</td>
</tr>
<tr>
<td>HMIP</td>
<td>Her Majesty’s Inspectorate of Pollution (now part of the Environment Agency)</td>
</tr>
<tr>
<td>LPA</td>
<td>Local planning authority</td>
</tr>
<tr>
<td>LPG</td>
<td>Liquified petroleum gas</td>
</tr>
<tr>
<td>MHAU</td>
<td>Major Hazards Assessment Unit of CHID</td>
</tr>
<tr>
<td>NIMBY</td>
<td>‘Not in my back yard’</td>
</tr>
<tr>
<td>NIHHS</td>
<td>Notification of Installation Handling Hazardous Substances Regulations 1982</td>
</tr>
<tr>
<td>Seveso II</td>
<td>Control of Major Accident Hazards Directive 1998</td>
</tr>
<tr>
<td>TOR</td>
<td>Tolerability of risk</td>
</tr>
</tbody>
</table>