The impact of social amplification of risk on risk communication

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The impact of social amplification of risk on risk communication

Professor Glynis M Breakwell & Dr Julie Barnett
Social Psychology European Research Institute
School of Human Sciences University of Surrey
Guildford
GU2 7XH
United Kingdom

Other members of the research team:
Dr Ragnar Lofstedt
Professor Ray Kemp & Christina Glaser
University of Surrey

This report presents the findings of a project to identify and examine factors most likely to lead to the intensification or attenuation of risk perceptions and to draw out lessons for best practice in risk communication. The role of UK media institutions in these amplification processes was explored. A specific aim was to derive testable hypotheses about the factors which both predispose and trigger, or causally affect, the amplification of risk.

The findings indicate that the Social Amplification of Risk Framework (SARF), developed in the 1980s falls short of being able to capture the complexity of risk issues in the UK. It is suggested that new analytical concepts are needed if the framework is to have predictive power and inform specific and effective risk communication initiatives. New concepts have been developed by the researchers to enable them to refine understanding of risk amplification processes, and provide greater predictive power and practical utility in relation to short and long term risk communication strategies.

The research has identified that there are critical points when the orientation, tempo or strength of the social image of a hazard changes significantly. The factors which trigger critical points and their place within hazard sequences is examined, as are the factors that influence how a story involving risk is covered by the media. Overall, this research argues that in developing these concepts SARF has developed from being a general framework towards being a model with some predictive power and practical utility. Arguably, it has changed it to such an extent as to supplant it.

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EXECUTIVE SUMMARY

OBJECTIVES OF THE STUDY

Risk management has become a dominant concern of public policy and yet the ability of government to anticipate the strength and focus of public concerns remains weak. This has proven to be costly. Rectifying the misunderstandings and assuaging the deep anxieties that surround “scares” and accidents can, and does, cost governments billions of pounds. It is thus vital to understand the genesis and development of such risk impacts.

The Social Amplification of Risk Framework (SARF) was designed to assist in this endeavour. The current research was designed to test the applicability of SARF to the UK context and to develop its application to risk communication.

Specifically the aim was to derive ‘testable hypotheses about the factors which both predispose and trigger or causally affect the amplification of risk’. We believe that this has been achieved and this report outlines the results of this research.

COMPONENTS OF THE STUDY

There were two components to the research – a series of case studies and a set of media interviews. A number of insights have been gained from these that have implications for the practice of risk communication. We have particularly drawn out the implications that these have for government departments.

Case studies

Secondary data analysis was used in relation to the life cycles of 4 hazards to explore the value of SARF. This has been done in relation to: AIDS, BSE, the contraceptive ‘pill scare of 1995 and the siting and development of a Shell NGL plant.

In doing this we had 3 specific aims.

• to identify critical points in the development of the way in which a hazard is understood that shift perceptions and/or impacts towards different states of amplification.
• to explore the way in which risk communication initiatives on the part of the government link with the life cycle of the hazard and the various amplification processes that are evident within this life cycle.

• to develop a methodology that would adequately achieve these aims.

As the research has progressed it became clear that there are a number of implications of this work for the way in which the regulator is perceived. In the light of this, the project was extended for a further three months in order to specifically explore this issue in relation to BNFL and Sellafield MOX data falsification incident of 1999-2000.

Media interviews

The primary objective for this part of the project was to establish what factors are perceived by editors and journalists in the televisual, radio and print media to affect the way they report stories about hazards and risks.
MAIN CONCLUSIONS

Having situated the data from both the case studies and the media interviews in relation to SARF, our research suggests that the framework falls short of being able to capture their complexity.

The layering method has proved to be a valuable tool both in evaluating SARF and in suggesting the importance of the processes that link the constructs that SARF identifies.

This research has important implications for the ways in which research and data collection is commissioned. An optimal set of core of questions should be developed and included in research projects that deal with hazard reactions. This would enable effective monitoring of change over time and the establishment of data sets that permit the layering method to be used to inform policy development.

This research also has implications for SARF itself. It suggests that new analytic concepts are needed if the framework is to have predictive power and to inform specific and effective risk communication initiatives. We would argue that without the adaptation of theory and method we propose, SARF’s predictive and analytic power is limited.

Other concepts have thus been developed here that we believe will enable us to

- refine our understanding of risk amplification processes
- provide greater predictive power and practical utility in relation to both short and long term risk communication strategies by government departments.

Specifically, critical points are phases of varying lengths of time when the orientation, tempo or strength of the social image of a hazard changes significantly. Self interest, moral outrage and the arousal of fear are identified as principles that are instrumental in leading to an event achieving critical point status.

Critical points are often situated within hazard sequences. A hazard sequence is a series of hazard notifications which may (but need not) be technically related but that are ‘structurally similar’. They occur in specifiable temporal sequence and are each open to amplification processes.

Media templates are constructed for different risk events. These then direct reporting of the hazard. The use of media templates has implications for speed with which the
media operate and for the nature of media reports. This has clear implications for the responses required of regulatory agencies and these are discussed in the report.

Within the overall hazard there are a number of different hazard structures (sub-hazards) and at different times these will become subject of *hazard negotiations*. Stakeholders can focus on specific sub-hazards in order to affect particular amplification strategies. The regulator can be invoked to support this process.

The media interviews revealed a series of factors that influence how a story involving risk is covered and shape the decision-making processes involved. To summarise these briefly, commercial pressures on the media promote scare stories; they seek to provide "iunfotainment"; they consequently avoid reporting "real science"; the culture allows individual journalists and editors to pursue private agendas in reporting hazards; codes of pratice in the media accentuate amplification processes; the absence of investigative journalism fuels a desire for information which is accessible and pre-digested; different arms of the media have different priorities; pressures groups work the media well; and, the media like controversy and uncertainty, they are audience-grabbers. Each of these factors has a part to play in the processes of amplification as defined in SARF.

With the refinements this research suggests, SARF has moved from a general framework towards being a model that has some predictive power and practical utility. However, it could be argued that SARF is no longer SARF; it is so changed that it is supplanted.
MAIN REPORT

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MAIN REPORT

FORMAT OF THE REPORT

This report has nine sections

- Executive Summary
- Main report
- Annex 1: Social Amplification of Risk Framework and the Layering Method
- Annex 2: Media approaches to hazard stories
- Annex 4: Amplification of risk: BSE
- Annex 6: Amplification of risk: the siting and development of an NGL facility
- Annex 7: Amplification of risk: Sellafield

OUTLINE OF MAIN REPORT

This report is structured in the following way.

First the objectives of the study and its components will be summarised. This will be followed by an outline of SARF in conjunction with a pre-empirical theoretical appraisal of the framework. This section also notes the development of a new method with which SARF can be evaluated: ‘the layering method’. The main conclusions of the report will then be summarised. The way in which the analysis of the case study material was conducted and insights derived from the layering method outlined. Following this, a number of concepts that have the potential to develop the predictive power and practical utility of SARF will be described. These are

- Critical points
- Critical point triggers
- Hazard sequences
- Hazard templates
- Hazard negotiations
The material compiled in this research also affords insights into several other areas that are current in the risk literature. These are also noted. Within each section, implications for the regulator will be highlighted.

The themes and implications of the media interviews will then be noted. The final section will suggest priorities for future research.

Throughout the Main Report, the Annexes will be referenced as appropriate.

OBJECTIVES OF THE STUDY

Risk management has become a dominant concern of public policy and yet the ability of government to anticipate the strength and focus of public concerns remains weak. This has proven to be costly. Rectifying the misunderstandings and assuaging the deep anxieties that surround “scare” and accidents can, and does, cost governments billions of pounds. It is thus vital to understand the genesis and development of such risk impacts.

The Social Amplification of Risk Framework (SARF) was designed to assist in this endeavour. This research was designed to test the applicability of SARF to the UK context and to develop its application to risk communication. The framework is summarised below and outlined more fully in Annex 1.

Specifically the aim of this research was to derive ‘testable hypotheses about the factors which both predispose and trigger or causally effect the amplification of risk’. We believe that this has been achieved and this report outlines the results of this research.

COMPONENTS OF THE STUDY

There were two components to the research – case studies and media interviews. A number of insights have been gained from these that have implications for the practice of risk communication. We have particularly drawn out the implications that these have for government departments.
Case studies

Secondary data analysis was used in relation to the life cycles of 4 hazards to explore the value of SARF. This has been done in relation to: AIDS, BSE, the contraceptive ‘pill scare of 1995 and the siting and development of a Shell NGL plant. The life cycle of a hazard is taken here to include all phases in the existence of the hazard (pre-notification, recognition, during action to control or remove, and ultimate endpoint).

In doing this we had 3 specific aims.

• to identify critical points in the development of the way in which a hazard is understood that shift perceptions and/or impacts towards different states of amplification.

• to explore the way in which risk communication initiatives on the part of the government link with the life cycle of the hazard and the various amplification processes that are evident within this life cycle.

• to develop a methodology that would adequately achieve these aims.

As the research has progressed it became clear that there are a number of implications of this work for the way in which the regulator is perceived. In the light of this the project was extended for a further three months in order to specifically explore this issue in relation to BNFL and Sellafield.

Media interviews

The primary objective for this part of the project was to establish: what factors are perceived by editors and journalists in the tele-visual, radio and print media to affect the way they report stories about hazards and risks.

PRE-EMPIRICAL THEORETICAL APPRAISAL OF SARF

SARF was developed in the late 1980’s as a response to the disjunctures between the various strands of risk research. These were seen to limit our understanding of the meaning and social causes of risks (Renn, Burns, Kasperon, Kasperon, & Slovic, 1992, p.157) It aims to facilitate a greater understanding of the social processes that can mediate between a hazard event and its consequences.
“...Events pertaining to hazards interact with psychological, social, institutional and cultural processes in ways that can heighten or attenuate public perceptions of risk and shape risk behaviour. Behavioural patterns in turn generate secondary social or economic consequences. These consequences extend far beyond direct harms to human health or the environment to include significant indirect impacts.” (Renn et al., 1992)

SARF identifies categories of mediator/moderator which intervene between the risk event and its consequences and suggests a causal and temporal sequence in which they act. Information flow through first various sources and then channels, triggering social stations of amplification, initiating individual stations of amplification, precipitating behavioural reactions. These engender ripple effects, resulting in secondary impacts.

The framework identifies two stages. Within Stage I the focus is upon the hazard event, the relationship between the various stations of amplification and their relationships with public perceptions and first order behavioural responses. Stage II of the framework is concerned with secondary impacts. Here there is a direct link between the amplification of risk perceptions and behaviours and secondary consequences. Secondary consequences consist of socio-economic and political impacts.

Thus far, the only substantial assessments of the validity of the framework have taken place in the States. Both quantitative and qualitative research have given support to the broad thrust of the framework that support the broad thrust of the framework, that is

“that physical events are observed and interpreted by groups and individuals, amplified by individual and social processes, and then expressed in terms of societal consequences” (Renn et al., 1992, p.154)

The extent to which SARF has proved to be of practical utility to policy makers until this point is unclear. The most recent published assessment of SARF (Pidgeon, 1999b), derived from work supported by a Health and Safety Executive grant, gives no indication of that SARF has thus far been utilised in a policy context. Indeed it implies that this is has not been done, certainly in the UK, rather suggesting that, “there is scope to apply the social amplification of risk framework in ways that begin to address this agenda” (p.10).
In the present research the layering method was developed because it is essential to use such a method to evaluate SARF. One aim of this research has been to assess the utility and the potential of this method to understanding risk events and their impacts. The layering method is described in detail in Annex 1.

The layering method requires data that are situated at different levels of analysis e.g. intra individual data about attitudes/beliefs; societal data for example relating to regulatory or economic changes. It also requires data that represent different constructs within SARF over the same time period. Finally, it involves looking at the relationship between these constructs at one time and over time.

Prior to an empirical exploration of SARF, several theoretical points can be clarified.

1. We believe that the applicability of SARF to risk communication is currently limited in that it does not specify the causal processes that inhabit the framework. It is only when the processes underlying risk amplification are understood that the possibility arises of being able to predict and effect change in the lifecycle of a hazard.

2. The originators of SARF have recognised the way in which the term 'amplification' is often wrongly taken to simply imply a focus on the intensification of the hazard. This confusion is perhaps unsurprising insofar as although 'amplification' is treated as a generic term, it is also used to simply denote the opposite process to attenuation. To clarify this and to more accurately reflect the processes evident in the case study material, we have developed a more differentiated conceptualisation of amplification processes. In the current research ‘amplification' will be used as the generic term and within this a number of different amplification processes will be situated. The distinctions that will be drawn may, at this stage, seem irrelevant to the practitioner, however in order for amplification to be useful as an analytic concept, they are vital. There are important practical implications of the different processes for agencies that are involved in risk communication.

Although not clearly defined within SARF, amplification refers to the discrepancy that might exist between expert and lay points of view, or, where there is amplification of impacts, to the discrepancy between expert assessments of the risk and the magnitude of the impacts that do or do not follow. Where public perceptions are such

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1 Amplification denotes the process of intensifying or attenuating signals during the transmission of information from an information source.. (Kasperson, Renn, Slovic, & Brown, 1988, p.180)

2 The amplification or attenuation of risk events through information flow is clearly complex..(Kasperson, 1992, p.173)
that the risk is much greater than expert assessments would suggest, we would term this \textit{intensification}. Conversely, where perceptions/behaviour suggest that the risk is much less than expert judgement would suggest, we speak of \textit{attenuation}. Following on from this we would suggest a third dimension of amplification, that is of \textit{representation}. In line with the notion of discrepancy this would mean that public perceptions and behaviour are constructed such that they coincide with expert assessments, rather than suggesting that the risks are greater or less. Clearly, there is considerable transience in what might regarded as the representation of the risk as amplification of risk is a dynamic process; new information is constantly being generated and communicated. The transience of clear risk representation is especially evident where there is scientific uncertainty, where expert assessments of the risk are themselves changing, and where there is ongoing conflict. Indeed such uncertainty and conflict may be instrumental in generating intensification of the risk. However, given these caveats, representation of the risk is generally the position that the regulator would like to achieve.

Bearing in mind that the task of the present research is to explore the applicability of SARF for government risk communication, one important focus is to explore ways of ‘undoing’ both risk intensification and attenuation processes. \textit{De-intensification} and \textit{de-attenuation} are used to refer to the movement towards representation away from the states of intensification and attenuation respectively (see Fig 1). When a risk is intensified, it is often the case that the regulators would like to target their risk communications at bringing public perceptions and social impacts into line with expert assessments of risk, that is, they would like to effect de-intensification. Similarly, when risks are attenuated and the public pay little attention to what the regulator might consider to be quite serious hazards, risk communications would then be aimed at de-attenuation. Our work would suggest that these are quite different processes and that this should be recognised in order to communicate risk most effectively.
This level of differentiation is not currently included within SARF where Kasterson (1996) equates attenuation with restraining of the amplification. However it would not seem in any way incompatible with it. Indeed a similar notion was referred to by Leiss (1999a) who suggested that there was a ‘holding category’ of risks that were neither associated with intensification nor attenuation and that were characterised by the expert and public risk construction being roughly in agreement. This characterisation should not be taken to imply that the public have a image of every risk.

Clearly there are some domains where it is inappropriate to think in terms of ‘undoing’ amplification processes; for example when risk issues are raised in the context of deliberative processes. In such situations the nature of risk amplification is affected by the ways in which regulatory agencies respond to the concerns of interested publics and stakeholders. In fact, unnecessary intensification may be averted by timely action by appropriate agencies. Determining what constitutes unnecessary intensification is, of course, a political process as well as a technical one.

3. In answer to the question of what it is that is amplified, the authors state that it is the consequences of the risk event. There can thus be evidence of amplification within stations of amplification (the media, institutions), in public perceptions and behaviour. SARF also states that there can be indirect consequences of amplification. These are seen in socio-economic and political impacts.
4. Hazards are conceptualised as contextualised and socio-historically grounded. That is, we are not simply concerned with the event that might be the subject of a risk assessment. In order to understand a hazard and the way in which it might be related to amplification processes it is important to consider the context within which it occurs.

MAIN CONCLUSIONS

Having situated the data from both the case studies and the media interviews in relation to SARF, our research suggests that the framework falls short of being able to capture their complexity.

The layering method has proved to be a valuable tool both in evaluating SARF and in suggesting the importance of the processes that link the constructs that SARF identifies.

This research has important implications for the ways in which research and data collection is commissioned. An optimal set of core of questions should be developed and included in research projects that deal with hazard reactions. This would enable effective monitoring of change over time and the establishment of data sets that permit the layering method to be used to inform policy development.

This research also has implications for SARF itself. It suggests that new analytic concepts are needed if the framework is to have predictive power and to inform specific and effective risk communication initiatives. We would propose that without the adaptation of theory and method we propose, SARF’s predictive and analytic power is limited.

Other concepts have thus been developed that we believe will enable us to

- refine our understanding of risk amplification processes
- provide greater predictive power and practical utility in relation to both short and long term risk communication strategies by government departments.

Specifically, critical points are phases of varying lengths of time when the orientation, tempo or strength of the social image of a hazard changes significantly. Self interest, moral outrage and the arousal of fear are identified as principles that are instrumental in leading to an event achieving critical point status.
Critical points are often situated within hazard sequences. A hazard sequence is a series of hazard notifications which may (but need not) be technically related but that are ‘structurally similar’. They occur in specifiable temporal sequence and are each open to amplification processes.

Media templates are constructed for different risk events. These then direct reporting of the hazard. The use of media templates has implications for speed with which the media operate and for the nature of media reports. This has clear implications for the responses of regulatory agencies.

Within the overall hazard there are a number of different hazard structures (sub-hazards) and at different times these will become subject of hazard negotiations. Stakeholders can focus on particular sub-hazards in order to effect particular amplification strategies. The regulator can be invoked to support this process.

The media interviews revealed a series of factors that influence how a story involving risk is covered and shape the decision-making processes involved. To summarise these briefly, commercial pressures on the media promote scare stories; they seek to provide "infotainment"; they consequently avoid reporting "real science"; the culture allows individual journalists and editors to pursue private agendas in reporting hazards; codes of practice in the media accentuate amplification processes; the absence of investigative journalism fuels a desire for information which is accessible and pre-digested; different arms of the media have different priorities; pressures groups work the media well; and, the media like controversy and uncertainty, they are audience-grabbers. Each of these factors has a part to play in the processes of amplification.

With the refinements this research suggests, SARF has moved from a general framework towards being a model that has some predictive power and more practical utility. We would suggest that improving predictive power is closely linked to practical utility. However, it could be argued that SARF is no longer SARF once the changes that are recommended are incorporated; that it is so changed, it is supplanted.
ANALYSIS OF CASE STUDIES: INSIGHTS OF THE LAYERING METHOD

We aimed to assemble data required by the layering method in relation to each of the case studies. That is, data that are situated at different levels of analysis and that represent different constructs within SARF over the same time period. This was done with varying degrees of success. The main exemplars of the layering method are provided by the AIDS and the BSE case studies (see Annex 3 and Annex 4). Each case study gives full details of the secondary data that was collected, the constructs of SARF that these represented and the relationships that were observed between these constructs.

Both of these case studies make it clear that the layering method has the potential to describe and predict relationships between different components of SARF. It provides some novel insights into the lifecycle of BSE and AIDS.

For example in the AIDS case study (Annex 3) the layering method reveals that:

- the steady decline in government spending on public education since 1994 largely reflects the declining trend in AIDS diagnoses and AIDS deaths. It bears no relationship to the incidence of HIV in the UK, which has been steadily rising over the same time period.
- the profile of government spending shows a similar pattern of peaks and troughs to the volume of non-news TV programmes on HIV/AIDS
- the amount of media coverage of UK national daily and Sunday press shows a similar profile to the uptake of HIV tests

The layering method also uncovered interesting relationships between different constructs of SARF in relation to BSE (Annex 4).

- The peak of media coverage in 1996 does not find a clear echo in the variety of public perception measures.
- Between 1989 and 1998 spontaneous mentions of concern about salmonella are considerably higher than those concerning BSE and yet this was over a period of time where media coverage of salmonella was almost non-existent
• Different cuts of beef showed different patterns of consumption and expenditure, both in relation to the initial decline (post March 96) and the subsequent recovery.

All these findings immediately beg the question as to why these things are so, what are the underlying processes that determine these relationships, and where do the mechanisms of cause and effect lie? This clearly highlights the need to focus upon the processes that underlie the relationships between the various components of SARF. Currently SARF is unable to specify particular hypotheses about the relationships between variables and gives no guidance as to the questions we should ask of the data.

There were limitations on the secondary data that was available. This limited the relationships within SARF that can be explored.

It is suggested that the insights that the layering method affords have implications for the ways in which research is commissioned. Data should be systematically collected on a long term basis. In doing this, particular attention should be paid to identifying key measures that are effective in tracking risk amplification. Having better data structured in a more appropriate fashion would allow more pertinent questions to be asked.

On the basis of the case studies and the media interviews several concepts have been developed.

CRITICAL POINTS

Within the process of amplification critical points can occur. Critical points are phases of varying lengths of time when the orientation, tempo or strength of the social image of a hazard changes significantly.

The layering method facilitates the examination of critical points. Tracking key variables over time enables the identification of significant changes in patterns of data that appear to be causally related or coterminous with a change in the representation of the hazard. This is a key focus of the BSE case study. There were changes in the patterns of media, public perceptions, consumer and policy responses that centred upon the March 96 announcement of the likely link between BSE and CJD.

Outside of the layering method, the ‘pill scare’ case study also suggests the importance of critical points. Support for the notion of secondary impacts that follow
a critical point in the UK context is provided by examination of the range of impacts associated with the announcement by the Medicines Control Agency of the link between several third generation pills and an increased risk of thrombosis. This proved equally pivotal in terms of both public and media reaction and in respect of broader socio-economic impacts.

In both these case studies evidence is presented for the impacts that followed a critical hazard notification\(^3\). However, both of these case studies suggest that the effect of a critical point may be considerably more complex than SARF might suggest. This was confirmed by the case of the Mox data falsification at Sellafield (called here the Mox incident). In that case, the critical point was not the hazard notification but the failure of BNFL to alert customers to the full implications of the quality control deficits in their production facility and the moral outrage that followed in their key Japanese market.

The layering method used in relation to BSE indicated that different indices of public perceptions and different impact variables depicted different profiles of intensification. Evidence is also presented indicating that these impacts varied in the way that they affected different groups/regions. Although many variables clearly reflected the March ’96 hazard notification, there were no simple relationships between the volume of media coverage, levels of public concern, government expenditure and impacts upon consumption of, and expenditure on, beef.

In the case studies several critical points have been identified. Of course, it might be argued that these are only visible retrospectively. There are questions about the extent to which these can be identified as critical points at the time and to whom it would be obvious that they were critical points. One would expect that in any one instance, people positioned differently in relation to the hazard would have different levels of awareness of a critical point.

CRITICAL POINT TRIGGERS

From a policy point of view it is vital to understand what makes a hazard notification critical. Why is it that some hazard notifications are apparently not associated with

\(^3\) Hazard notifications refer to both formal regulatory notifications as well as public identifications of a hazard.
secondary impacts and others are? What are the dynamics that shift a hazard from one social representational anchor to another, acting as critical point triggers in the social amplification of risk.

As it stands SARF deals with this issue by suggesting that there may be particular combinations of factors that cause a ‘take off’ point in a controversy. Kasperson (1992) suggests that there are several elements that may trigger the take off of the social amplification process; a concerned public, active media coverage, a feared risk, active opposition groups. He suggests that these may need to present in combination: in isolation they might be necessary but not sufficient for amplification to occur. The presence or absence of other factors, such as pre-existing levels of trust or effectiveness of managerial may also block or facilitate their effect. This theme is also referred to by Pidgeon (1999b) in relation to the possibility of synergistic effects between factors.

Certainly, in the case studies, a number of factors have been seen to be associated with the occurrence of a critical point.

- Hazard notifications
- Some significant group paying attention
- Off stage occurrences: coterminous, apparently extraneous events that add significance to the hazard event in question.
- The skilled intervention in the course of the event: the evidence of new skills, personnel, information or a new interpretation
- Change in the cost benefit equation
- New element of the hazard
- Changes in the power balance

However, the secondary analysis of the case studies suggest that there are three main principles underlying critical points; that are instrumental in making an event achieve critical point status

- that it impacts upon the self interest of a large number of people. In the case of intensification, that it has the power to trigger self interest and that in the case of attenuation that such self interest is not generated. In this case people do not see it as having personal relevance, or that a change in behaviour is warranted.
that the event is related to the capacity to trigger moral outrage, blame or the suspicion of blame. A change in the representation that is indicative of intensification will be associated with assignation of blame and a sense of moral outrage. For risk events that are attenuated this will be absent.

We also believe the critical events are associated with the capacity for an emotional response, such that intensification of risks are associated with the arousal of fear. Conversely, where hazards are attenuated there is no such emotional reaction.

There is evidence that these principles were triggered in the critical points in the case studies. Where public concern is intensified, we would argue that these principles underlie subsequent critical points. However, in at least one of the case studies (Sellafield: Annex 7) intensification was not primarily routed through public concern. Under these circumstances (which SARF does not allow us to consider), critical points do not have these underlying dynamics.

This research suggests that several factors that have been identified by SARF as being associated with the ‘take off’ of an event have been present in the case studies. However, unless they are associated with a threat to self interest, the generation of moral outrage and an emotional reaction, a critical point will not result.

This has a number of policy implications:

- To achieve de-attenuation (that is, to heighten awareness of and responsiveness to a hazard) it is crucial to trigger self interest, moral outrage or to arouse emotion.

- If these dynamics are used as triggers, it should be recognised that public perceptions may well change more speedily than might be anticipated and that this may well engender a critical point.

Awareness of these principles is also crucial in terms of attempting to defuse or limit the impacts of a critical point. Where an agency believes that there is risk intensification, communicating available information that allows a re-assessment of the way in which (for example) self interest is threatened is likely to contribute to changing the trajectory of intensification. The BSE case study (Annex 4) provides an illustration of how a reduction in the price of beef affected economic indicators of risk intensification in that it contributed to a return to increased consumption of beef.
Similarly, the Shell case study (Annex 6) highlights the role of economic self interest in affecting the tolerability of the risk.

Pressure groups are also motivated and active in relation to critical points. The Shell case study documents how the extremely able and active group that worked against the siting and development of the plant used strategies, aimed at inducing moral outrage and fear and making others concerned that that their self interests were in danger of being eroded.

This work in relation to critical points constitutes a series of working hypotheses that stem from secondary analysis. Further work is needed in this area and these hypotheses should be tested in relation to ongoing hazard representations. For instance, if it could be shown that self-interest was not involved in the consequences of a hazard, would it be possible to ameliorate intensification? This would lead to risk communications more specifically targeting changes in self interest, moral outrage and fear.

HAZARD SEQUENCES

The notion of hazard sequences was mainly developed in relation to the Pill case study (Annex 5). It draws attention to the importance of considering the effect of a series of hazard notifications.

A hazard sequence has the following elements

- A series of hazard notifications, which may (but need not) be technically related but would be ‘structurally similar’. By structurally similar it is meant that each notification has the capacity to trigger the social representation of the object at risk. For example, in the Sellafield case study (Annex 7), there were hazard notifications relating to safety lapses, management inefficiency and financial viability. Each of these aroused the negative social representation of BNFL and of nuclear power.
- Occurring in specifiable temporal sequence
- Each open to amplification processes
The critical hazard notification for the OC pill in 1995 was part of a sequence of related hazard events. There have been several hazard notifications relating to the OC pill since that time, none of which have precipitated a similar reaction. i.e. this was the most significant hazard notification in the hazard sequence. Subsequent notifications have been met with general disinterest on the part of the public and the media. Substantive differences between the notifications in the hazard sequence are acknowledged.

However, the pill case study makes a series of arguments about hazard sequences.

- SARF does not consider the way in which a series of related or re-iterated hazard notifications affects the amplification of risk.
- This scenario is a common one for government agencies.
- The notion of hazard sequences has been developed to deal with this.
- Within a hazard sequence there is often a critical hazard notification.
- Hazard sequences can help explain why de-intensification occurs after a critical hazard notification.

Evidence from this area suggests that amplification stations are constrained in their choice of hazard representation by what has previously happened. This is particularly the case in relation to very memorable related hazard notifications. The nature of these constraints and the way in which previous hazard notifications affects the reception of later ones requires further exploration.

The Mox incident analysis confirmed a further element of our understanding of hazard sequences. Hazards in the sequence may be of completely different types (for instance in this case, technical, managerial and financial) but work together to intensify the risk associated with any one of them.

There are a number of implications of hazard sequences for the regulator

- Apply methods to monitor hazard sequences in areas of prime significance.
- Learn to predict hazard sequences. Most importantly this means being aware of when a hazard notification is likely to be critical (in terms of triggering self interest, moral outrage or fear)
• Anticipate de-intensification: this has implications for resource allocation. Where effecting de-intensification is a priority, resources may well be allocated to this. However, if this is not a priority, our research suggests that de-intensification will occur spontaneously in relation to later hazard notifications.

It is important to link critical points and hazard sequences. Potential critical point triggers vary in their likelihood to act as such in relation to where they occur within a hazard sequence. The Pill case study illustrates how expert disagreement (often considered to be an important factor in inducing or cementing public uncertainties and anxieties) was very much part of the critical hazard notification. However it was also present at later notifications within the hazard sequence that were not linked to intensification.

The evidence from the case studies suggests that there is not likely to be a 'critical cocktail' of trigger events, because this will vary in relation to

• the extent to which they tap self interest, moral outrage and fear
• their position in the hazard sequence

HAZARD TEMPLATES

The Pill and BSE case studies highlight the importance of hazard templates in the media and the ways in which government agencies should respond to these.

Both the case study material and the media study indicate that the media construct ‘templates’ for different risk events which then direct reporting of the hazard. These templates would include information about the hazard, relevant organisations and individuals, a range of arguments, scenarios and counter arguments concerning causes, what the event signals and so on.

There are several implications of media templates

• The media are a learning organisation using new information to adjust an old template or create a new one. Each hazard in a sequence is thus greeted by a changed media.
• a critical point generally involves the creation of a new hazard template
• for later hazard notifications within a sequence the same template will be applied unless there is information that challenges it or renders it obsolete
the template used at one stage acts as an affordance upon the types of information that are sought in relation to later hazard notifications. It may also affect other things such as the motivation to collect information and the likelihood of that particular sources will be accessed.

The Mox incident showed another feature of hazard templates. Whenever one hazard is described, the other string of hazards associated with it are rehearsed in brief, thereby refreshing the overall impression of riskiness. This is another part of the media template for hazard stories.

Government agencies can counter the amplification of risk that may be associated with the use of a media template by

- Understanding the content of the media template being used within a hazard sequence
- Plan hazard notifications in full acknowledgement of the template being used by the media.

Both of these things are necessary if the regulator’s response is to match the speed at which hazard templates can be applied by the media. Being prepared to give a relevant and rapid response is vital. Developing organisational cultures that are flexible and pro-active is a vital part of this.

HAZARD NEGOTIATIONS

Within the overall hazard there are a number of different hazard structures (sub-hazards) and at different times these will become the focus for the amplification strategies of interested parties. The Shell case study is particularly relevant in this area (Annex 6).

Two issues are particularly pertinent

- Interested stakeholders can negotiate a focus on particular ‘sub hazards’ in order to effect amplification processes.
- The regulator can be invoked to warrant particular views and courses of action by parties that are trying to effect amplification processes.

It is therefore vital to consider how the regulator should operate in such a context.
One strategy is for the regulator to be more visible in promoting a representation of itself as a position of neutrality and independence is unlikely to be inferred from silence. To be successful in this a careful understanding and appraisal of amplification processes for all parties involved is required. Further work is needed to explore the ways in which perceptions of the regulator's independence could be fostered as well as how different pressure groups implicate the regulatory authority.

The Mox incident analysis helps our understanding of both the operation of pressure groups and the role a regulator can take in relation to a hazard negotiation. In the Mox incident, green pressure groups behaved in exactly the way they would be advised to act in order to optimise their impact. Their messages were simple, categorical, direct and repeated at all opportunities. They never engaged with the details of the incident but they propose a "simple" total solution to the problem. In the Mox incident, the Nuclear Installations Inspectorate (NII) clearly emphasised its separation from the licensee (BNFL). The analysis presented in Annex 7 suggests the implications determined by this stance for intensification processes.

**ADDITIONAL CONCLUSIONS FROM THE CASE STUDIES**

**Culture context**

Within SARF, culture is simply specified as an over arching variable. The Sellafield case study (Annex 7) is indicative of the way in which the broad historical and political context acts as an affordance on the operation of other variables. In any study of risk amplification processes it is important to specify such contextual factors and the effects that they had on the more proximal causes of risk amplification.

The Mox incident was played out on the international stage. It signalled the importance of cultural and socio-political context for intensification processes. Japanese cultural concern with losing face was a vital ingredient in its commercial reaction to the hazard notification. Also the Japanese people's historical and contemporary preoccupation with nuclear safety was vital to the fuelling of intensification.

From the point of view of developing a risk communication strategy, it is vital to acknowledge that the audience is inevitably diverse and heterogeneous. If one of these ‘publics’ is ignored this may lead to a negative reaction from them. In addition to this however, their reaction is likely to lead to further amplification by impacting on other parts of the audience.
The Shell case study (Annex 6) is also relevant to the issue of segmented publics. It notes the importance of understanding how variations in amplification processes are linked with parameters such as socio-economic status, geographical location, employment situation and media exposure. It also notes the value of attempting to systematically describe the diverse types of public reaction. One benefit of doing this would be to locate the views of pressure groups within a wide spectrum of opinion. This would avoid giving undue weight to a minor but salient segment of the public when designing risk communication strategies.

Uncertainty

SARF does not allow any specification of the way in which uncertainty affects risk amplification. Thus it cannot facilitate the development of risk communication strategies that take the associated uncertainties into account. The BSE case study (Annex 4) suggests that it is crucial to be able to do this.

The BSE case study also suggests that the outcomes of communicating uncertainty may vary in relation to the amount of associated controversy. That is, it may be that in highly controversial situations uncertainty should be handled in a different way than in less controversial situations. The interaction of controversy and uncertainty and its implications for risk management is a major research topic for the future.

Recent research in this area has indicated that admissions of uncertainty can be understood by lay publics and that this need not necessarily lead to the erosion of trust in, and credibility of, the source. It may be that admitting uncertainty and explaining what is being done to resolve it may check intensification processes. However, admissions of uncertainty should not be de-contextualised. It is vital to locate uncertainty in relation to (potential) controversy; to anticipate what rebuttals and attacks the admission of uncertainty may unleash.

The Mox incident illustrates a different type of significance of uncertainty. It shows that failure to analyse the extent of and reasons for uncertainty in the public or the media concerning the safety message that transmitted opens the source of a safety message to intensification processes.
Trust

Within SARF, trust can moderate amplification processes. Personal and organisational qualities of being open, transparent, responsive and willing to consult can dilute the pressure towards risk intensification created by other factors. Where it is perceived these qualities are absent, there would be a greater likelihood of risk intensification.

However, there may be an important distinction to be made between general and specific levels of trust. We would suggest on the basis of the BSE case study, that for an organisation occupying a low position upon the generic trust ladder, it does not necessarily follow that every statement will be distrusted. Rather actions can generate trust in specific areas; sources can operate to change specific levels of distrust.

In order to understand processes of amplification it would thus be important to understand what can be done in particular contexts to increase specific trust. Agencies in whom general trust is low should not despair.

MEDIA INTERVIEWS: MEDIA APPROACHES TO HAZARD STORIES

The primary objective for this part of the project was to establish: what factors are perceived by editors and journalists in the tele-visual, radio and print media to affect the way they report stories about hazards and risks. Leading editors and journalists representing a wide range of different media were targeted for interview. Twenty four people were interviewed and their anonymity was assured. The majority of those interviewed were very senior and well-known figures in the media.

The analysis was designed to examine what factors the editors and journalists believe affect the way they report stories about hazards or risks. This was done by the use of a thematic content analysis of the interview transcripts and notes. This approach allows the data to lead the analysis rather than any a priori assumptions of the researcher.

Each of the themes emerging encapsulated factors that influence how a story involving risk is covered and shape the decision-making processes involved. These themes were:
Risk Is Not A Category Of Story But "Scare Stories" Are

All interviewees had difficulty with the questions that asked them to make statements about "risk stories". Stories are not categorised as "risk" stories. Indeed, most of those interviewed considered the definition of "risk" to be confused. Certainly, they did not identify how they would treat a story that involved any differently to other stories. One reason is that many consider all stories to have a risk element: "All life is risk-laden".

However, "scare stories" are recognised as a category. They are recognised to have certain characteristics. The best scare stories involve a threat to a lot of people, primarily to the most blameless and defenceless but valuable (mainly perceived to be children and pregnant women), are unseeable until they strike and have major, preferably fatal, long-term consequences. Scare stories are considered to be good for audience figures or circulation. They are also sometimes a product of having to simplify in order to get the story across to audiences that do not understand risk concepts.

Practical implication: It would seem that the commercial pressures on the media will always promote scare stories. Without abrogating its responsibility to communicate risk information, the object of any government organisation must be to avoid being the source of such a story. Information should be provided in such a way as to be proactive in minimising the possibility of a scare. If it provides relatively concise, simple but accurate information (alongside, if necessary, more detailed facts) it could avoid the accidental creation of the scare that is based on media misunderstanding. This will not avoid misrepresentation but it will minimise the scope for it.

The Significance of Infotainment

The interviewees argued that the media do not sensationalise but rather they provide infotainment (which sometimes entails exaggeration). Infotainment basically means providing information in a manner that is entertaining. Even the highly specialist magazines were recognised to "be in the entertainment business". In relation to stories involving risk, this effort after infotainment will preclude pursuit of stories that say there is no risk or minimal risk. More importantly, those stories that involve a hazard that is applicable to a large number of the public are "more newsworthy". Of course, infotainment value declines with repetition. Consequently, even serious hazards involving large numbers will fail to gain coverage.
Practical implications: There are many implications for organisations concerned with influencing media coverage of hazards in this focus upon infotainment:

- the newsworthiness of a story will decline unless fed with new information (where information is broadly defined - i.e. can include commentary or interpretation) - if it is desirable to continue coverage of a hazard, to prevent attenuation of the perceived risk for instance, drip feeding information to the media will be important;

- the entertainment value of a story is linked to the controversy it reports (uncertainty and controversy are considered further below) - managing the representation of the controversy is important for an organisation concerned with the development of a risk story and this may mean actively participating in the controversy rather than remaining silent;

- an organisation should have representatives that can tell the story in the media in an entertaining way - this means in a way which is attention-grabbing and appealing to a wide audience.

The Media Avoid "Real Science"

There was agreement amongst the interviewees that the media - generally - avoid "real science" in their stories. The message has to be stripped down to be palatable to the journalist's particular audience. This avoidance of the scientific details may tied to the fact that few journalists dealing with scientific or medical hazard stories would have been trained as scientists, engineers or health specialists. Interestingly, none of those interviewed considered this to be a disadvantage for them.

Practical Implications: Taken together these factors suggest that any organisation that wishes to have a story that involves sophisticated scientific or technical information carried by the media accurately will need to provide that information structured very carefully. It would perhaps seem sensible to offer a story that was already stripped down to the essentials (perhaps alongside any more detailed exposition). Also it would make sense to have an expert in the field ready to respond to follow-up questions but again in a way which was directed at the level of the educated lay audience. A further practical implication for an organisation handling these stories with the media is that it either needs to train or select its own personnel in order that they can communicate in the format required or it needs to use external reputable mediators through which it sources media information.
The Importance of Individual Journalists and Editors

Everyone interviewed made a point of acknowledging the importance of the individual editor or journalist in choosing a story and determining what line would be taken. There was a general recognition that journalists and editors can be campaigners and that they can be highly biased as a result in the way they choose to handle particular stories. Interestingly, it was suggested that these biases are relatively well-known and established and thus predictable.

Since many of those interviewed had been in their jobs for many years (over 25 in one case) their personal preoccupations and perspectives should be open to analysis and their future proclivities in decisions open to prediction.

Practical Implication: Any organisation wishing to deal effectively with the national media should be concerned to understand the key media players at a personal professional level. The media should not be treated as an impersonal mass when developing a communications strategy.

There is another implication of the longevity in their posts of these senior journalists: they acquire massive portfolios of examples of hazard stories. They naturally draw the parallels across stories, they draw lessons for the interpretation of newly breaking stories from all the past instances they recall. These journalists have their own implicit records of hazard sequences. Each new instance is seen and interpreted within the frame of the relevant hazard sequence. From the journalist or editors point of view this is essential since it allows for a very rapid assimilation of a new story and offers templates for reporting it and following it up.

It would seem beneficial in such situations for any organisation dealing with the media to determine what template for reporting is being used and what hazard sequence is being assumed. This serves two purposes:

- it can be used to refine the manner in which any refutation is provided;
- it can be used to anticipate the likely course of subsequent coverage of the story and this in itself should alert the organisation to the ways in which it might be expected to react.
The Significance of Interactions Between Media

Interviewees emphasised that scoops were good but a scoop that no one else followed up was not valuable. It was good to beat the competition to a story but not to be the only person to report it. There was perceived to be safety in numbers. It is noteworthy that this professional code operates since it may account for several of the phenomena of amplification (both with regard to intensification and attenuation). It is often notable that a risk story is intensified by a bandwagon effect of the media (one runs the story and others reiterate and expand it). Attenuation will occur where journalists do not believe that they will find that others report the story and thus are disinclined to do so themselves.

The practical implications for an organisation wishing to work with the media on risk stories are:

- where intensification is desirable, it is useful to make available the means for individual journalists to produce something novel in their representation of the story;
- where attenuation is undesirable, it is useful to ensure that several journalists are aware that others will carry the story.

The Absence of Investigative Journalism and Information Hunger

Several interviewees argued that investigative journalism is in decline. Consequently, journalists look for information to be provided to them. They are ripe for proactive information delivery. These interviewees repeatedly said that they wanted government departments to be more proactive in providing information. They were universally critical of the public relations machinery that currently exists in government. They are seen to create "media vacuums" that encourage speculation and distrust. The absence of a pro-active stance is interpreted by many of the interviewees to reflect not only incompetence but also the tendency to cover up.

There is a major practical implication for government departments and agencies from this: it is time to revamp the machinery that they use to connect to the media. If the media are not provided with accurate information, they will go elsewhere and get whatever information (accurate or not) is available.
Length and Timing of Coverage

The amount of time that a story will run depends on the availability of fresh information. As long as there is new information, a new slant, the story will be continued - in principle. However, many interviewees emphasised that stories could be squeezed out by more important stories. To bury a story, it is useful to announce it on the day that the media attention is fully absorbed elsewhere. Publication timetables also affect choice and timing of coverage.

Practical Implication: Any organisation using the media to represent risk issues must recognise the heterogeneity of the media. It must be alert to the different timescales that operate for different parts of the media.

Differences Between Elements of the Media

Interviewees pinpointed key differences between various elements in the media and their general approach to stories. The major differences between print and televisual media was identified by one TV editor: "in TV the seconds matter, in TV the pictures matter".

The "speed to air" required now of TV and radio is often underestimated by government organisations. A marked mismatch of expectations is evident: government organisations want to provide information on risk issues that is fully verified, the TV and radio want information as it emerges, verified or not.

The Role of Pressure Groups

Interviewees were clear that pressure groups play a major part in shaping the coverage of risk issues.

Government organisations need to understand more about the relationship between the media and pressure groups of various sorts. Currently, there is no recognisable systematic effort on the part of government organisations to proactively deal with pressure group involvement in risk stories. Strategies of agenda setting followed by other organisations (such as professional associations or particular journals) also need to be further considered by government departments and agencies.
Uncertainty and Controversy

Interviewees were asked how difficult/easy it is to report events where there is little certainty about how risky they are. Uncertainty was not considered particularly difficult to handle but in itself was not considered newsworthy.

Even though they expressed cynicism about the motives government sources have when they report uncertainty, there was complete agreement that reporting uncertainty was better than waiting until all doubts were resolved to say something.

The implications of this for government organisations would appear to be:

- provide the media with continuous information concerning levels of uncertainty on key risk issues;
- link explanations of uncertainty with descriptions of what is being done to resolve the uncertainty.

Following this approach would mean that there is no information vacuum (vitally important in preventing media alienation) and that uncertainty is tied to action not to cover up.

It would seem sensible when delivering information on levels of uncertainty to the media to avoid the use of any figures that when translated by them into a format they feel will be understood by the public could be misinterpreted. It may be that the uncertainty information should be delivered already translated in this way. This suggests that government organisations need to know more about acceptable ways of describing uncertainty.

Uncertainty is not newsworthy but uncertainty that engenders or emerges from controversy is eminently newsworthy. Where proposed levels of uncertainty are challenged or claims of certainty trashed by some other source, the interviewees would focus their attention. Some interviewees remarked that government sources do not lose credibility by admitting uncertainty per se. However, they tend to lose credibility in the controversy which then develops around the substantive issue on which they have expressed uncertainty.

The implications for government organisations are that:

- they should examine how they perform in controversies;
- they should analyse how they interact with the media in controversies;
and, develop a policy for media briefing during the life cycle of the controversy.

Surprisingly, perhaps, many of the interviewees said that they would not mind government organisations trying to manage media briefing more actively. They would value timely and properly structured information on risk issues.

These interviewees, without exception, showed a remarkable degree of insight about their own activities as professionals and about the values and organisation of their profession as a whole. They had already analysed for themselves what were the important issues in relation to their interactions with government. They knew what to expect from government organisations. More importantly, in large part, they shared these understandings. They had common objectives and values. They were in competition with each other but within a shared frame of reference. They were consequently predictable to each other. Given the diversity of the media, this creates an unexpected degree of coherence. From the point of view of any organisation wishing to deal with the media, this coherence, once appreciated in all its complexity, must be an important factor in shaping strategy.

FUTURE RESEARCH

The findings from this study suggest further research would be profitable. This research should examine:

- the negotiation and deliberate use of amplification processes by stakeholders – what can the regulator learn from pressure groups about maximising their own effectiveness, what are the most effective ways of reversing amplification processes?
- how socially excluded groups relate to amplification processes (e.g. how are they differentially affected by them, what especial barriers do they face in affecting amplification processes, etc). The notion of self interest in critical points is pertinent here. How do marginalized and empowered groups make themselves heard when it may be only their interests that are threatened.
- the deliberate creation/triggering of critical points … how that is done from the point of view of pressure groups.
- what would be the optimal set of core of questions to be included in research projects that deal with hazard reactions in order to enable effective monitoring of change over time and the establishment of data sets that permit the layering method to be used to inform policy development.
• the concepts of critical points, critical points triggers and hazard sequences, in order to develop a screening device to assess the likelihood of occurrence of amplification processes. Having developed the methods and analytical tools identified in this research, it would seem possible to derive such specific applications within a further research programme of between 18-24 months.

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ANNEX ONE

THE SOCIAL AMPLIFICATION OF RISK FRAMEWORK AND THE LAYERING METHOD

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THE SOCIAL AMPLIFICATION OF RISK FRAMEWORK AND THE LAYERING METHOD

INTRODUCTION

This research was commissioned in order to explore the applicability of the Social Amplification of Risk Framework (SARF) within the UK context. This issue has partly been addressed in relation to secondary analysis of case study material. The method used to do this has been termed the ‘layering method’.

This Annex serves 2 functions in this report.

- To describe the basis structure of SARF
- To describe the layering method

THE SOCIAL AMPLIFICATION OF RISK FRAMEWORK

The object here is simply to provide a brief outline of the framework within which the collected data and their subsequent evaluation can be situated. The interested reader will find much more detail in the several publications that give comprehensive coverage of it (Kasperson, Renn, et al 1988; Renn, 1991; Renn, Burns et al, 1992; Kaperson, 1992; Burns, Slovic et al 1993; Kasperson and Kasperson, 1996, Pidgeon, 1999) SARF was developed in the late 1980’s as a response to the disjunctures between the various strands of risk research. These were seen to limit our understanding of the meaning and social causes of risks (Renn, 1992, p.157). It aims to facilitate a greater understanding of the social processes that can mediate between a hazard event and its consequences.

“…Events pertaining to hazards interact with psychological, social, institutional and cultural processes in ways that can heighten or attenuate public perceptions of risk and shape risk behaviour. Behavioural patterns in turn generate secondary social or economic consequences. These consequences extend far beyond direct harms to human health or the environment to include significant indirect impacts.” (Renn et al, 1992)
DESCRIPTION OF SARF

SARF identifies categories of mediator/moderator which intervene between the risk event and its consequences and suggests a causal and temporal sequence in which they act. Information flow through first various sources and then channels, triggering social stations of amplification, initiating individual stations of amplification, precipitating behavioural reactions. These engender ripple effects, resulting in secondary impacts.

The framework identifies two stages. Within Stage I the focus is upon the hazard event, the relationship between the various stations of amplification and their relationships with public perceptions and first order behavioural responses. There are social and individual stations of amplification and the way that that signals are created and processed depends on various qualities of these stations. Stage II of the framework is concerned with secondary impacts. Here there is a direct link between the amplification of risk perceptions and behaviours and secondary consequences. Secondary consequences consist of socio-economic and political impacts; for example, these might be financial, regulatory or may involve stigmatisation of products or places. ‘Ripple effects’ may lead to ‘third order impacts’ where responses are generalised to other hazards. To summarise, SARF suggests that psychological, social, institutional and cultural processes can extend or constrain the temporal, sectoral and geographical scales of impacts (Renn et al, 1992).

In answer to the question of what it is that is amplified, the authors state that it is the consequences of the risk event. From the description above it should be clear that there are consequences that are situated at Stage I and Stage II. So, there can be evidence of amplification within stations of amplification (the media, institutions) and in public perceptions/behaviours. This would constitute amplification at Stage I. At Stage II of SARF there would be amplification of socio-economic impacts.

Much research that is relevant to Stage I of SARF deals with single sets of relationships; for example the relationship between media variables and public perceptions. Arguably though, it is amplification at Stage II that is of most interest and concern for policy makers (Pidgeon, 1999). There has been little systematic study of the ways in which secondary impacts are related to the social processing of risk. This is especially so in the UK.
EMPIRICAL APPROACHES TO ASSESSING SARF

It would thus seem important in evaluating the utility of the framework in the UK to consider the relationships between all of the levels of data that SARF identifies. In the US a major quantitative study approached the issue in this way and aimed to assess the central thrust of SARF: that socio-economic impacts of a risk event are essentially determined by social processes rather than the physical characteristics of the risk event. The study operationalises five sets of variables: the physical consequences of the risk event, media coverage, risk perception, public reactions, and societal impact (Burns et al, 1993). The assessment of SARF concerned the relationships that exist both within and between these variables.

It is instructive to note how these were operationalised and measured.

- the ‘physical consequences of 128 hazardous events’ were estimated by expert judgement on four scales, e.g. human exposure to the risk agent, magnitude of human casualties
- the amount of press coverage about these events, i.e. total number of stories pertaining to each event, duration and half life of coverage
- individual lay person perceptions of these events. Students rated each event on a number of scales
- public responses to these events in terms of individual behaviour intentions and group mobilization potential. Survey respondents were asked for hypothesised responses in relation to the former and for the latter social science experts were asked to rate the expected social mobilization potential of each event.
- socio economic and political impacts/consequences were measured by asking experts to estimate potential repercussions of each event

The relationships between variables are explored with correlations and by and large the size and direction of these support the broad thrust of the framework. It was concluded,

“that physical events are observed and interpreted by groups and individuals, amplified by individual and social processes, and then expressed in terms of societal consequences” (Renn, et al. p.154)
The authors admit to several limitations of the study noting that it is less than ideal that the perceptions of students were used, and that several variables were simply constructed in relation to expert ratings. However, we would argue that one valuable contribution which SARF makes is to draw attention to the value, if not the necessity, of simultaneously assessing a variety of data when considering the operation of amplification processes. Although in the studies noted above there were particular limitations in terms of the data that were available to capture the constructs of the framework, in principle it is clear that any overall assessment of SARF will involve examination of the way in which the layers operate and of the way in which they interact.

A second contribution of the SARF although not one that was explored in the studies mentioned above is the implicit focus upon the way in which amplification processes change and develop over the lifecycle of the hazard. Moving as it does from a consideration of the qualities of the hazard event to delineating the nature and extent of impacts that it is eventually associated with, SARF draws attention to the importance of building the time dimension into the methodological approach adopted.

THE LAYERING METHOD

In evaluating SARF it is clearly essential therefore to use a method that simultaneously explores a number of layers of data. Ideally this should be done over the life cycle of a hazard. Our theoretical assessment of SARF suggests that its applicability to risk communication is currently limited in that it does not specify the causal processes that inhabit the framework. It is thus essential that any methodology for understanding the social processing of risk also facilitates a consideration of the processes that determine the manner in which mediators/moderators operate or the nature of their interactions.

To meet these requirements the ‘layering method’ was developed. The key requirements of the method are that

- it accesses data at various levels of analysis that as far as possible pertain to the same time period.

- It includes data which act as metrics for a broad range of constructs in the model (individual representation, action, media representation etc) which refer to the same periods of time as far as possible.
• It uses forms of analysis which examine relationships of constructs at one time and over time. Change (or the lack of it) as hazard events undergo a variety of amplification processes is crucial within the framework. This cannot be clearly seen with a snapshot simply portraying the configuration of factors evident at any one moment. Where the data permit, the layering method includes the time dimension as a systematic focus of the analysis.

The layering method is thus an integrative, multidimensional technique for capturing data and identifying relationships.

A valuable contribution of SARF is that it motivates the collection of data in a layered way. Incorporated with a consideration of the processes that operate within and between these layers, the method has the potential to identify, explore and predict amplification processes.

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ANNEX TWO

MEDIA APPROACHES TO HAZARD STORIES

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MEDIA APPROACHES TO HAZARD STORIES

OBJECTIVE OF THE MEDIA STUDY

The primary objective for this part of the project was to establish: *what factors are perceived by editors and journalists in the televisual, radio and print media to affect the way they report stories about hazards and risks.*

METHOD USED

Leading editors and journalists representing a wide range of different media were targeted for interview. It was decided that we should interview people working for:

- national daily newspapers - both broadsheet and tabloid;
- national weekly newspapers;
- regional newspapers;
- specialist magazines (normally monthlies);
- BBC radio - national and regional;
- commercial radio;
- national/international television - BBC, ITV, SKY

In addition, we interviewed some freelance journalists who work across different media.

In-depth one-to-one interviews were used. The outline interview schedule is presented in Annex 1. This was used as the framework for the interview but often interviewees would open up different lines of inquiry and these were pursued.

All interviews were conducted by one of three interviewers. Most interviews were conducted face-to-face but some had to be conducted over the telephone to comply with interviewees’ availability. Most interviews were audio-taped and subsequently transcribed for analysis. Those interviews conducted over the telephone were not taped but extensive notes were taken during the interview. Interviews typically lasted about an hour, though some were much longer.
Twenty four people agreed to be interviewed. Their anonymity was assured and consequently neither their names nor the specifics of their employer will be revealed here. However, the breakdown of the sample by media type is given in Table 1.

**Table 1: Sample Breakdown**

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<tr>
<th>5 (2)</th>
<th>National daily newspapers - both broadsheet and tabloid</th>
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<td>National/international television - BBC, ITV, SKY</td>
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<td>3 (1)</td>
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The number of interviewees holding posts as editors (as opposed to purely as journalists) is given in brackets in Table 1. The majority of those interviewed were very senior and well-known figures in the media.

It should be noted that a further 26 people were approached for interview. They either declined outright due to disinterest in the subject matter or lack of time or failed to respond to repeated efforts to contact them. There was no link between unavailability for interview and type of media employer or status.
FORM OF ANALYSIS

The analysis was designed to examine what factors the editors and journalists believe affect the way they report stories about hazards or risks. This was done by the use of a thematic content analysis of the interview transcripts and notes. This entails initially identifying a theme which is present forcefully in one interview and examining whether it recurs in others. Systematic differences according to type of media or status (e.g. editor/journalist) in what is said about any one theme then can be examined.

This approach allows the data to lead the analysis rather than any a priori assumptions of the researcher. It must be acknowledged, nevertheless, that the structure of the initial questions in the interview will determine to some extent the themes that can emerge. The questions asked were specifically designed to allow us to understand more about the processes of decision-making in the media that might explain how social amplification of risk might occur.

The themes that emerged are summarised below and are illustrated where useful with quotations (without attribution since anonymity was promised).

MAIN THEMES

Each of the themes summarised below can be seen to encapsulate factors that influence how a story involving risk is covered and shape the decision-making processes involved.

Only themes that recur in many of the interviews are included here. After describing the themes, the implications for organisations attempting to influence the manner of media risk coverage are outlined.

Theme 1: Risk Is Not A Category Of Story But "Scare Stories" Are

All interviewees had difficulty with the questions that asked them to make statements about "risk stories". Stories are not categorised as "risk" stories:
"In fact, you don’t actually, as a journalist, you don’t see stories in terms of risk and non-risk. You see stories in terms of pegs, in terms of relevance to your audience, you see stories in terms of interest."

Indeed, most of those interviewed considered the definition of "risk" to be confused. Certainly, they did not identify how they would treat a story that involved any differently to other stories. One reason is that many consider all stories to have a risk element: "All life is risk-laden".

However, "scare stories" are recognised as a category. They are recognised to have certain characteristics:

"One terrific plus is if children are involved. That’s the best. Because parents go into kind of panic overdrive and that’s really the tops…also a kind of unseen menace is pretty damned exciting. So, like the BSE, the fact that in twenty-five years we could all be dropping like flies, and particularly our children dropping like flies from the beef-burgers that we fed them, is a tremendously good story, isn’t it?"

The best scare stories involve a threat to a lot of people, primarily to the most blameless and defenceless but valuable (mainly perceived to be children and pregnant women), are unseeable until they strike and have major, preferably fatal, longterm consequences. Scare stories are most likely to work (i.e. engage public interest) if they are capable of being personalised. Victims need to be identified; if they are already known to the public (celebrities in some form), all the better. Most health scare stories involve women. Several interviewees pointed out that this might be because women are more health conscious than men and react more to health advice. Notably it was suggested that newspapers that seek to attract women readers are major venues for health scares involving women.

However, scare stories are considered to be good for audience figures or circulation generally:

"that is the thing you have got to know about scare stories.. they do sell newspapers. And they make people watch. So scare stories are extremely good in terms of audience building."
The value of scare stories for sales or audience figures explains in part their popularity with journalists. However, interviewees also emphasised that scare stories were sometimes a by-product of the difficulties they experience when trying to cover stories about the risks:

"the public don't understand risk. It is often reported ‘this is three-times more dangerous’ but often what the public aren't fully aware of is that the original risk was absolutely negligible. Three times f*** all is f*** all. Often it is impossible to get this message across. You often see this with the financial coverage, you know. You see the graphs going down and down and down until you realise that the cut-off point is not zero but it is the difference between…. it's not fully covered…. and it’s the difference between 7.8 and 7.9 and so it's just not proper reporting of what the relationship is. It is the same thing in risk reporting, because you are doing this to grab the attention. The public are seen to have a very low attention span on these issues and you’ve got to get this in."

"The problem is how you explain that to an audience that doesn’t find it easy to think in terms of probabilities and in terms of risk. I have heard it argued that the human species just doesn’t think that way. But I think that’s really just an easy cop out. People are pretty good at deciding on cumulative bets and the chance of the lottery and what-have-you, so I think that people can do it if they want to do it. But, of course, it falls down on something like BSE where the scientists are bending over backwards to tell us that there is no risk but, of course, there was a risk. There is a risk. We don’t know what it is but it is clear that there is a risk."

The process of simplifying the arguments about the risk in order to capture the audience's attention and transmit at least some information about the story results in the omission of subtleties of interpretation, caveats and counter-arguments and can engender a scare story.

It would seem that the commercial pressures on the media will always promote scare stories. The object of any government organisation must be to avoid being the source of such a story. At least in one way it could be proactive in avoiding the scare story. If it provides relatively concise, simple but accurate information (alongside, if necessary, more detailed facts) it could avoid the accidental creation of the scare that is based on media misunderstanding. This will not avoid misrepresentation but it will minimise the scope for it.
Theme 2: The Significance of Infotainment

It is not uncommon to hear organisations claim that the media amplify risk because they sensationalise issues (e.g. the man-eating bug story). Perhaps not surprisingly, the interviewees argued that the media do not sensationalise but rather they provide infotainment (which sometimes entails exaggeration). Infotainment basically means providing information in a manner that is entertaining. Most of the interviewees in one way or another drew a distinction between the provision of pure information (in some educational fashion) and what they were doing. Even the highly specialist magazines were recognised to "be in the entertainment business". One interviewee commented:

"We write to entertain people not just to impart information and we have to do that in a way which is captivating for them, basically bringing them to read your article in your newspaper as opposed...to other newspapers. We are in a very competitive business".

In relation to stories involving risk, this effort after infotainment will preclude pursuit of stories that say there is no risk or minimal risk. More importantly, those stories that involve a hazard that is applicable to a large number of the public are "more newsworthy". Of course, infotainment value declines with repetition. Consequently, even serious hazards involving large numbers will fail to gain coverage. One interviewee gave an example: "if we were really concerned about writing about big avoidable risks in life, then obviously we would be writing about smoking a lot of the time, because smoking is the biggest avoidable risk that we face today. And we do write about smoking. But there is only a certain limit to the number of stories that you can write of that nature. You've got to move on. News is a progressive thing."

There are many implications for organisations concerned with influencing media coverage of hazards in this focus upon infotainment:

- the newsworthiness of a story will decline unless fed with new information (where information is broadly defined - i.e. can include commentary or interpretation) - if it is desirable to continue coverage of a hazard, to prevent attenuation of the perceived risk for instance, drip feeding information to the media will be important;

- the entertainment value of a story is linked to the controversy it reports (uncertainty and controversy are considered further below) - managing the representation of the
controversy is important for an organisation concerned with the development of a risk story and this may mean actively participating in the controversy rather than remaining silent;

• an organisation should have representatives that can tell the story in the media in an entertaining way - this means in a way which is attention-grabbing and appealing to a wide audience.

Theme 3: The Media Avoid "Real Science"

Whilst they expressed it in many different ways, there was agreement amongst the interviewees that the media - generally - avoid "real science" in their stories:

"most coverage of scientific issues in the media never gets into the science, never gets into the experiments and really explains what it is about; it’s ‘the scientists have discovered that…. You read the précis list or television story and it never really tells you what they do it and how they know this and whether really other people think that the difference is correct."

The message has to be stripped down to be palatable to the journalist's particular audience. This avoidance of the scientific details may be tied to the fact that few journalists dealing with scientific or medical hazard stories would have been trained as scientists, engineers or health specialists. Interestingly, none of those interviewed considered this to be a disadvantage for them. In fact, it was seen as a signal advantage since they were more likely to "see the wood for the trees", focus on the important issues, and steer clear of the technicalities that their "audience would neither understand nor require". As one said,

"I generally work on the principle that if I can understand it then probably the listener and the viewer can".

Another pointed out:

"I think the mystique of science is over played. It is not difficult. If you talk to people on a level and they talk to you back on a level. I usually say to people ‘Look - treat me as a precocious 14 year old. Talk to me at that level and I will understand you’ and if they go into proteins and metabolic processes and
enzyme productions I say ‘Actually just give me the principles of what happens. The mechanism and the principles and how this works. A = B = C’. And most science, good science, actually does that and you can … every profession I know has jargon and science is no different. But actually, when you get down to it, it is very straightforward…once you get past that conceptual process and you go to ‘What did you find out, and what does this mean?’. It’s very straightforward.”

This type of argument was typically accompanied by two caveats:

- the claim that, in any case, they could call upon expert advice whenever they needed it and that the availability of specialist support was improving (as the scientific community becomes more media-friendly and as the Internet provides instant access to many literatures);

- they had been doing their job a long time - they had learnt "on the job" much of the science and medicine needed to understand the issues they needed to cover. One commented "it is usually quite easy in science.. to differentiate between what is bogus and rather pretentious and what is real"

Taken together these factors suggest that any organisation that wishes to have a story that involves sophisticated scientific or technical information carried by the media accurately will need to provide that information structured very carefully. It would perhaps seem sensible to offer a story that was already stripped down to the essentials (perhaps alongside any more detailed exposition). Also it would make sense to have an expert in the field ready to respond to follow-up questions but again in a way which was directed at the level of the educated lay audience. The practical implication for an organisation handling these stories with the media is that it either needs to train or select its own personnel in order that they can communicate in the format required or it needs to use external reputable mediators through which it sources media information.

Theme 4: The Importance of Individual Journalists and Editors

Everyone interviewed made a point of acknowledging the importance of the individual editor or journalist in choosing a story and determining what line would be taken. They may be limited by the mission or culture of their paper or channel (more of this below) and by their competition, but they do have remarkable latitude of decision-making.
There was a general recognition that journalists and editors can be campaigners and that they can be highly biased as a result in the way they choose to handle particular stories. One interviewee encapsulated this:

"the journalist is a campaigner, or as … not just as a sort of spectator / bystander / impartial witness, but as actually as a participant and, to some extent, the journalist clearly is a participant." Some are known to participate more than others. Some have clear biases.

Interestingly, it was suggested that these biases are relatively well-known and established and thus predictable. Also, they are capable to assigning each other to positions on a ladder of cynicism towards government or medical or scientific sources, particularly concerning hazard notifications.

Since many of those interviewed had been in their jobs for many years (over 25 in one case) their personal preoccupations and perspectives should be open to analysis and their future proclivities in decisions open to prediction. One interviewee suggested that any organisation wishing to deal effectively with the national media should be concerned to understand the key media players at a personal professional level. The media should not be treated as an impersonal mass when developing a communications strategy.

There is another implication of the longevity in their posts of these senior journalists: they acquire massive portfolios of examples of hazard stories. Without exception, the interviewees involved in the national media were spontaneously providing serially full details of what we would call risk stories: when they broke, the main events, the way it way reported, who made what errors, etc. They naturally draw the parallels across stories, they draw lessons for the interpretation of newly breaking stories from all the past instances they recall. In so far as this holds, these journalists are compiling their own implicit records of hazard sequences (as defined elsewhere in this report). Each new instance is seen and interpreted within the frame of the relevant hazard sequence. From the journalist or editors point of view this is essential since it allows for a very rapid assimilation of a new story and offers templates for reporting it and following it up. A template here is taken to be a framework or pattern for making sense of a new story and for explaining it to the public. The template might include prescriptions for who should comment on the story, who should be expected to be occupying the role of "victim" and who would be anticipated to be the "villain", where to look for evidence of these assumptions, and the amount of space that should be dedicated to it. Templates are
used as a means of abbreviating the process of explanation. To some extent this is possible because the public has implicit knowledge of the standard templates that are regularly used. The media and public share this system of shorthand.

For an organisation dealing with the media on a risk story that has been located within a hazard sequence, based on the personal experience of the journalists, there are a number of implications:

- the journalists will direct their enquiries to areas that would support their assumptions about where this new story fits in the sequence;
- the journalists will "jump to conclusions" (for instance about causes and likely outcomes) more rapidly than would be justified by the information available specific to the story;
- assimilation by the journalists of information that refutes their conclusions will be relatively slow.

It would seem beneficial in such situations for any organisation dealing with the media to determine what template for reporting is being used and what hazard sequence is being assumed. This serves two purposes:

- it can be used to refine the manner in which any refutation is provided;
- it can be used to anticipate the likely course of subsequent coverage of the story and this in itself should alert the organisation to the ways in which it might be expected to react.

Theme 5: The Significance of Interactions Between Media

There was consensus that no journalist likes to be proven wrong. So:

"No journalist likes to be found to be wrong and if one has said to ones Editor, ‘BSE … look there’s nothing in it’ you know on the 31 March 1996 Stephen Dorrell and John Patterson say, ‘actually we think there might be something in it’. Big embarrassment, big egg on face, very unpleasant, not nice, could loose job, not happy."
Yet no journalist wishes to miss the big breaking story. Excessive caution is worse than excessive zeal.

"You get more egg on the face by not reporting something that turns out to have been real."

This results in a fascinating dance amongst journalists that involves steps of collusion and competition. Interviewees emphasised that scoops were good but a scoop that no one else followed up was not valuable. It was good to beat the competition to a story but not to be the only person to report it. There was perceived to be safety in numbers.

It is noteworthy that this professional code operates since it may account for several of the phenomena of amplification (both with regard to intensification and attenuation). It is often notable that a risk story is intensified by a bandwagon effect of the media (one runs the story and others reiterate and expand it). One interviewee commented:

"Often the night desk and the night editor will see something in another paper and say 'well we have only done a tiny bit on that but they have done it big, so we'll now do it big'; they don't trust their own judgement. If you notice, and you don't if you are not in the industry, all the first editions of papers and how they will change later."

Following a first report elsewhere allows the journalist not to be standing alone and the expansion allows them to claim some originality or novelty for their story. Attenuation will occur where journalists do not believe that they will find that others report the story and thus are disinclined to do so themselves.

The implications for an organisation wishing to work with the media on risk stories are:

- where intensification is desirable, it is useful to make available the means for individual journalists to produce something novel in their representation of the story;
- where attenuation is undesirable, it is useful to ensure that several journalists are aware that others will carry the story.
Theme 6: The Absence of Investigative Journalism and Information Hunger

Several interviewees argued that investigative journalism is in decline. No one should expect the media to go out to uncover the truth about risk issues if it took time or resources. "No one has the time to act as undercover detectives. Journalists are the most expensive item that any newspaper or any broadcasting medium has."
Consequently, journalists look for information to be provided to them. They look for:

- leaks;
- pressure groups to expose the risk;
- formal authorities (government, scientists, etc.) to offer information.

The media are information hungry. They do not have the time or money to get that information for themselves and are dependent upon those who provide it. They are consequently ripe for proactive information delivery. These interviewees repeatedly said that they wanted government departments to be more proactive in providing information. They were universally critical of the public relations machinery that currently exists in government. The government department PR people were seen to be:

- inexpert in the subject matter;
- badly informed about the department's or agency's activities and policy;
- incapable of responding quickly to requests for information;
- unable to make connections between different bodies of information;
- unaware of the priorities and requirements of the media.

They are seen to create "media vacuums" that encourage speculation and distrust. The absence of a pro-active stance is interpreted by many of the interviewees to reflect not only incompetence but also the tendency to cover up.

There is a major implication for government departments and agencies from this: it is time to revamp the machinery that they use to connect to the media. If the media are not provided with accurate information, they will go elsewhere and get whatever information (accurate or not) is available. "A media vacuum does not create good coverage, it does not create good public awareness of the issues."
Several acknowledged that it did not mean that they would write what you wanted if you provided information but they suggested that you stood a better chance than if no information was offered.

**Theme 7: Length and Timing of Coverage**

The amount of time that a story will run depends of the availability of fresh information. As long as there is new information, a new slant, the story will be continued - in principle. However, many interviewees emphasised that stories could be squeezed out by more important stories. The Manchester Bomb, the death of Princess Diana, the crash of the Concorde - such momentous events would exclude other stories. The point here is that a story once excluded must be very robust to be resurrected later. To bury a story, it is useful to announce it on the day that the media attention is fully absorbed elsewhere.

Publication timetables also affect choice and timing of coverage. The journalists and editors involved with specialist monthly publications emphasised that they could not deal with risk stories in the same way that others did. They could not expect to provide their audience with breaking news since they have very long lead times in the preparation of issues. They consequently sought to avoid covering short-term or volatile risk issues. They were only interested in risk issues if they were known to be ongoing and where they could provide pieces that had added value (for example, an international comparative perspective or a highly controversial juxtaposition of competing views). The existence of the monthly outlet can mean that a form of "sleeper" effect occurs: for example, a risk is announced but ignored by the dailies (e.g. a lice shampoo for children is suspected of causing cancer) and then gets picked up again several weeks later because a monthly magazine sees ways of connecting the story to its particular audience's concerns.

Any organisation using the media to represent risk issues must recognise the heterogeneity of the media. It must be alert to the different timescales that operate for different parts of the media. The impact of "sleeper" effects is little understood but it is worth considering how they operate.
Interviewees pinpointed key differences between various elements in the media and their general approach to stories. The major differences between print and televisual media were identified by one TV editor: "in TV the seconds matter, in TV the pictures matter" and another commented

"Good stories are spiked without pictures - visuals can drive decisions on which stories to run."

The requirement for 24hr news and the need for visual input make TV thirsty for illustrated information. Where it is not available, the TV company must create it. There are well-tried techniques for producing an ongoing report of a risk story in the absence of actual information or film footage. The TV crew interview each other or "experts" that will speculate. They use archive footage. Satellite-linked crews appear on the "scene" (if there is one) to scavenge any bit of information, which is then instantaneously transmitted. The image of Sainsbury's supermarket car park full of media after the Paddington rail crash was often mentioned.

The "speed to air" required now of TV and radio is often underestimated by government organisations. TV and radio is perpetually broadcasting and the pressure to fill the airwaves is palpable among the journalists involved. It results in impatience with organisations that cannot also maintain perpetual information access. A marked mismatch of expectations is evident: government organisations want to provide information on risk issues that is fully verified, the TV and radio want information as it emerges, verified or not.

Different parts of the media differ along other dimensions too, particularly with regard to their mission or culture. It seemed from the interviewees that different newspapers and TV or radio channels could be ranged along a continuum that represented responsibility. Some national broadsheets and some national TV and radio channels were said to be guided in their coverage of a risk issue by a concern for acting responsibly: in a manner that would not arouse unnecessary public concern or anxiety. Others did not have this as a component in their value system. The sense of responsibility was reported to be of prime importance for some journalists. It would determine whether what they wrote or said was ever published or broadcast. Those working for the BBC all mentioned its core
values that dictate editorial policy. Interestingly, those working for more commercial organisations were also all fully alert to the value systems of their employers. Several made it clear that the political orientation of their organisation would dictate whether they could follow a particular story and the slant they would take on it.

Differences in emphasis between national and regional or local media were also emphasised by interviewees (note: few were working for regional or local media at the time of the interview but most had past experience of such work and all interacted across the national/local divide on a regular basis). For local media, they argued, the story was given significance and would be pursued if it had local relevance. Even big national stories would be ignored or given brief mention if they had no local dimension. The smaller the audience covered by an element of the media, the greater the attempt to attune the provision of information to the needs, interests and prejudices of that audience. Representatives of the local media pointed out that they "did not want to scaremonger". They identify with their communities and do not wish to arouse anxiety - unless the anxiety was already evident. Then to reinforce it was appropriate, merely responding to a proven interest.

At the level of the national media, there were clear differences reported between the news journalists and the specialist science or health correspondent. The specialists all mentioned that if the risk story was big enough it would become the preserve of news. If that happened, while they might still produce a story report, they would normally lose editorial control of the copy. They perceived this as often resulting in an overly simplified version of the story appearing. Particularly problematic was the effect of sub-editors who chose headlines that might make the story appear more significant but who, in doing so, totally change the meaning of the body of the report. Interviewees recognised that this process often undermined the trust that their sources had in them. Academics were "forever" complaining that their words had been mangled and misrepresented and according to the interviewees this was not their doing but a product of the sub-editing system. Interestingly, this system cannot change material that is a direct quotation. Suggesting that academics (or others) who want to be accurately represented should insist that they are quoted verbatim.
Theme 9: The Role of Pressure Groups

Interviewees were clear that pressure groups play a major part in shaping the coverage of risk issues. It was argued that they understand the need for pro-active information provision and that they understand the timetables that rule publication. For example, interviewees explained that a good time to break a story was Sunday p.m., thus providing a lead story for early Monday. This Sunday for Monday approach is used systematically by pressure groups. Pressure groups were also regarded as offering good spokespeople (characterised by simplicity of message and capacity to illustrate with examples galore). In some areas, pressure groups were regarded as a vital channel for information because they controlled access to at risk groups. If a national newspaper wanted to provide evidence that people with disability X did not like government policy or felt at risk as a result, it would often be pressure group X that found a person with disability X to exemplify the problem. Controlling the pool of case studies that personalise a story and give it direct emotional power is an important element in the way pressure groups gain media access.

Government organisations need to understand more about the relationship between the media and pressure groups of various sorts. Currently, there is no recognisable systematic effort on the part of government organisations to proactively deal with pressure group involvement in risk stories.

There are other sources of pressure that work to set risk agendas for the media. The Lancet and British Medical Journal both have strategies for pre-warning the media of upcoming stories. Each week, prior to their own publication, they circulate a press release containing 3-5 stories that they think merit media attention. They thereby ensure that they gain coverage in some form.

Strategies of agenda setting need to be further considered by government departments and agencies.
Theme 10: Uncertainty and Controversy

Interviewees were asked how difficult/easy it is to report events where there is little certainty about how risky they are. Uncertainty in itself was not considered particularly difficult to handle. Most said they would use quotes from the expert sources that were indicating uncertainty. Uncertainty in itself was not considered newsworthy. As one pointed out

"it is changes in levels of uncertainty that are interesting."

Another commented that

"what makes uncertainty interesting is who is uncertain and what they are uncertain about."

There was a remarkable degree of consensus that expressions of uncertainty emanating from government sources are often politically driven. In a context where the risks are unknown but something must be said for political reasons then statements of uncertainty are made. Alternatively, some suggested that when the risks are known, but acknowledging them at the time would be politically uncomfortable, expressions of uncertainty are used as a way of delaying the ultimate revelation. There was clearly great cynicism about claims of uncertainty emerging from government sources. Virtually all mentioned the delays in giving information on BSE/CJD in this regard.

Even though they expressed cynicism about the motives government sources have when they report uncertainty, there was complete agreement that reporting uncertainty was better than waiting until all doubts were resolved to say something. Refusing to say something until uncertainty is resolved was regarded with suspicion "it smacks of cover up and in any case causes an information vacuum."

Basically, government agencies were seen to be weak in handling issues of uncertainty. As one interviewee said "they muck it up and people don't believe them."

The implications of this for government organisations would appear to be:

- provide the media with continuous information concerning levels of uncertainty on key risk issues;
- link explanations of uncertainty with descriptions of what is being done to resolve the uncertainty.
Following this approach would mean that there is no information vacuum (vitally important in preventing media alienation) and that uncertainty is tied to action not to cover up.

Methods for expressing level of uncertainty are undoubtedly problematic for the media. The interviewees recognised that they could not use statistical expressions of probability in any rigorous way. One radio journalist said:

"We never use long figures in news bulletins because people can never take it in; we would say nearly a quarter, or half a million, or whatever. All those kinds of phrases we would use. That is the biggest problem we have come across… saying a figure and then not putting it into context means absolutely nothing to no one."

Another, very experienced correspondent said:

"In any publication, whether it's a paper or a more specialist journal, the statistics are only understood by a miniscule sub-section of the readership."

It would seem sensible when delivering information on levels of uncertainty to the media to avoid the use of any figures that when translated by them into a format they feel will be understood by the public could be misinterpreted. It may be that the uncertainty information should be delivered already translated in this way. This suggests that government organisations need to know more about acceptable ways of describing uncertainty.

Uncertainty in itself may not be newsworthy. However, uncertainty that engenders or emerges from controversy is eminently newsworthy. Where proposed levels of uncertainty are challenged or claims of certainty trashed by some other source, the interviewees would focus their attention. Controversy, where two or more sources voice opposing views, makes for excellent stories. More importantly, they are seen as easy stories because each side in the debate can be quoted.

"Controversies make for good infotainment. Controversies can be packaged so that they run and run."

Another said:

"when the controversy's gone… it's established and then it's in the textbooks and it's not journalism anymore."
It was notable that those from the print media like controversy more than those from TV or radio. One leading TV journalist and editor commented:

"TV is a blunt instrument for controversy. It is easy to confuse the public. There is a case for one-sided arguments."

This line seemed to be tied to a concern that explaining some controversies would engender unnecessary panic (the treatment of the MMR debate was given as an example).

Some interviewees remarked that government sources do not lose credibility by admitting uncertainty per se. However, they tend to lose credibility in the controversy which then develops around the substantive issue on which they have expressed uncertainty. One interviewee commented:

"Government departments, like DoH for instance, they don't know how to manage controversy... not like the pressure groups, Greenpeace and so on, they have it down to a fine art. For one thing, pressure groups will get to know which journos are on their side and use them."

The implications for government organisations are that:

- they should examine how they perform in controversies;
- they should analyse how they interact with the media in controversies (noting the differences between national and regional/local media);
- and, develop a policy for media briefing during the life cycle of the controversy.

Surprisingly, perhaps, many of the interviewees said that they would not mind government organisations trying to manage media briefing more actively. They would value timely and properly structured information on risk issues.

THEMES IN PERSPECTIVE

The themes described above are those that were most dominant in the interviews. There were others that might be important in other contexts but they had less to say about the development of policy by government organisations.
One overarching comment should be added here. These interviewees, without exception, showed a remarkable degree of insight about their own activities as professionals and about the values and organisation of their profession as a whole. They had already analysed for themselves what were the important issues in relation to their interactions with government. They knew what to expect from government organisations. More importantly, in large part, they shared these understandings. They had common objectives and values. Essentially, they were prepared for the job they had to do and knew what each other were about. They were in competition with each other but within a shared frame of reference. They were consequently predictable to each other. Given the diversity of the media, this creates an unexpected degree of coherence. From the point of view of any organisation wishing to deal with the media, this coherence, once appreciated in all its complexity, must be an important factor in shaping strategy.

APPENDIX 1: INTERVIEW NOTES

INTRODUCTION

This research is concerned with how the media handle stories about risks and hazards. We are interviewing people that are involved in decision making about which risks are reported and how risk is reported. We got your name through...

The research is based at the University of Surrey. It has been commissioned by the Inter Departmental Liaison Group on risk which involves people from a wide range of government departments, research committees and independent agencies.

None of the findings of the research will be used in a commercial context.

We will not be disclosing the names of any of the people that are being interviewed.

We would very much like to tape the interviews so that we can be sure that we represent you correctly. Nothing that you say will be attributed to you and conclusions will be reported only at the aggregate level. The tapes will then be destroyed. However, if you are not happy about the interview being taped it won’t be.
Introductory questions

Which media do you have experience of working with?

Could you tell me a bit about your job/ the types of decisions that you have to make?

General

How much of a goal is it in running a story simply to provide information?

How much do you think that the way a particular story is reported affects and shapes people’s views about it?

Is ‘responsible reporting’ an aim? What would irresponsible reporting consist of?

Do the media ever seek to reassure the public?

Under what circumstances might you decide not to report something at all?

What limits are there to what you can report or to the way in which you can report?

Definitions of risk

How, if at all, are risk stories different from other things that you report?

What things make a risk story a really good/big story?

How risk stories are reported

When reporting a risk event, how important are pictures?

To what extent is the aim in of a risk story to provoke a reaction in the audience/viewer/reader? If yes, what sort of reactions? How is this done?

Do you think that sometimes there is a climate where people are ‘ready for a scare’ about a particular issue?

Who decides what makes a hazard/an incident worth reporting?

Who makes the decisions about what risk related stories are covered in the news?
What happens when there are differences of opinion between (e.g. editor and producer) about this?

Are there any sorts of risk stories that are particularly likely to be the subject of differences of opinion about whether or not they should be covered?

To what extent are the personal preferences and interests of editors and producers reflected in the risk stories that are covered?

**How long should a story run?**

What prompts you to wind down coverage of a particular risk event?

Do you get a sense of how interested people are in a particular story? If so, how?

Do you ever seek feedback for what people think about a particular story? If so what sort of things do you ask about?

**Angle/ slant on a story: want to find out whether there are particular slants that are generally used?**

Does the angle taken always seem to be clear/self evident or can it sometimes be a matter of debate?

How important is it to relate a risk story to previous events in that area? E.g. If there was a new risk, how important would it be to relate this to other sorts of risk that people were more familiar with?

Is there a fairly established range of possible angles? *E.g.* ‘cover up’, ‘accident waiting to happen’, ‘individual victims’, ‘negligence’, ‘blame’. Are there ‘between paper differences in the extent to which these are likely to be used’?

Once the angle is established how much does this change in relation to obtaining new information? Conversely, to what extent is new information sought/reported in line with the chosen story line?

What are the constraints on reporting ‘all’ the sides to a story? How is it decided *not* to report a particular source/angle?
Audience?

Who do you consider your audience to be? What are their characteristics?

To what extent does the nature of your audience and what they might think/expect want
to believe affect the slant that you put on a risk story?

Are there any risk stories that you think that your audience would/wouldn’t be interested
in?

Approach to science stories?

How difficult is it to cover stories about new scientific developments?

How do/would you make such stories relevant to your audience?

How important is it to have a ‘human interest’ angle on such stories?

Uncertainty?

How difficult/easy is it to report events where there is little certainty about how risky they
are?

How important is it to be able to report statistical probabilities in a story?

Is greater credence generally attached to assurances of certainty or admissions of
uncertainty on the part of the government? Would these two things be reported
differently? If so, how?

(Explore the relationship between uncertainty and controversy - i.e. what is the
most/least productive/interesting combination for developing risk stories)

Sources of stories

To what extent does the status of the source affect the credibility of the story?

Is the nature of the initial source likely to be important in determining the direction in
which a story develops?

Would information coming from the government be treated differently than from other
sources? If yes, how?
When government comment on a particular risk issue how fully would this be reported?

**How do agencies try to manage you?**

In what ways might people or organisations try to manage you in relation to how you report risk stories?

What is most likely to be your response if you think that this is happening?

Is there ever a danger that the story will not be run at all if you are aware that this is happening?

Might it be helpful to allow yourself to be managed on occasions? If yes, how?

**Procedures**

To what extent is there a ‘normal’ set of procedures in terms of ‘checking’ a story prior to initially being reported?

If it is believed that the risk being reported represents an ‘exclusive’ for the paper/TV company, how might this affect when the story is first run?

How likely is it that such an exclusive is obtained? What might be the channels for obtaining such information? What are the more normal channels for non-exclusive information?

**Competition**

How important is it to be first with a particular news story?

How closely is the output of your competitors monitored?

On the occasions when you are not first with a particular story, how is the story subsequently reported? (e.g. might the importance of the story be minimised?)

How much energy might be invested in finding a ‘new angle’ on a story that has been reported elsewhere first?
‘Balanced’ reporting

How important is the idea of ‘balanced reporting’ in relation to risk? Is/should this be an aim? How is it achieved?

If there is limited time and space how do you choose which interested parties to report?

Are there any groups of people that would be a priority for you to talk to in relation to any particular story? If yes, who?

Different media

What would you see to be the main differences between the ways in which print media, radio and television report risk stories?

Particular hazards

Could you describe a specific hazard and the way you have covered it recently (e.g. BSE, GMOs, rail accidents, etc.).
# ANNEX THREE

## THE AMPLIFICATION OF RISK: AIDS

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THE AMPLIFICATION OF RISK: HIV/AIDS

INTRODUCTION

Millions of words continue to be written in analysis of the many facets of the AIDS issue. In contrast to the wide range of perspectives these provide, the additional words generated by this report are for a very specific purpose. They attempt to situate the lifecycle of the AIDS issue in the UK within the analytic perspective afforded by the Social Amplification of Risk Framework (SARF). The way in which this is done is stimulated by the use of the layering method (both SARF and the layering method are outlined in Annex 1). Secondary data have been gathered that represent various aspects of the framework. These layers and the way in which the various levels relate to each other will be described. The aim of doing this is to evaluate the framework and assess its applicability to risk communication initiatives. In doing this any insights that this new perspective gives on AIDS will also be noted.

The importance of developing a greater understanding of the most effective ways of communicating risk in this area would seem paramount in the light of the fact that more than 2.6 million people world-wide died from AIDS in 1999, the highest number in any year since the epidemic began (UNAIDS, 2000). In the UK there has been a steady rise in all of the sexually transmitted diseases since the mid-90s. Cases of gonorrhoea have been closely watched because, among heterosexuals, it appears to be spread only by unprotected sex. For that reason, it was chosen by the government, in its Health of the Nation white paper in 1992, as a marker for sexual behaviour and an indicator of HIV transmission. Consequently, the steady rise in the incidence of this and other STDs leads to fears that safer sex is being abandoned and speculation that the spread of HIV infection will increase. Furthermore, public health staff believe the rise in diagnoses, particularly among young people, is indicative of ignorance about the diseases and of the need for safer sex.

KEY POINTS FROM THE CASE STUDY

- The layering method has the potential to describe and predict relationships between different components of SARF;
- Attempts to use the layering method in this case study illustrated that SARF is of little help in specifying questions that might be asked of the data that it generates or in hypothesising the nature of relationships between variables;
the data that is currently available places limitations upon the relationships that can be explored;

- Use of the layering method nevertheless provides novel insights into the life cycle of AIDS. It is indicative of issues that, as it stands, SARF is not capable of addressing;

- Whilst suggesting the importance of many of the constructs that SARF identifies, it highlights the need for a focus on the processes that link these constructs;

- The case study illustrates that public anxiety and the behavioural changes that are associated with it following intensification can fade quickly

**KEY LESSONS FOR GOVERNMENT**

- There are important implications for the ways in which research is commissioned. Data should be collected systematically (with core questions being collected across research projects) and on a long term basis (using methods that allow genuine monitoring over time);

- Attention should be given to identifying key measures that are effective in tracking risk amplification;

- To produce persuasive messages that are coherent and consistent, organisational structures should facilitate the development of flexible, proactive and responsive procedures for managing risks;

- The effects of reactance to risk communication messages should be assessed. For example, the value of previous expenditure on education and advertising on HIV/AIDS should be assessed in relation to current beliefs and safer sex behaviours in this area.

**OUTLINE OF REPORT**

In making these arguments this report is structured in the following way. Firstly, the data collected relating to HIV/AIDS using the layering method will be described. Following this, the insights gained from layering these data will be described. The last two sections of the report will firstly evaluate the value of these findings for SARF, and finally discuss their implications for government of this both for understanding amplification processes and for the composition and execution of risk communication initiatives. It can be noted at the outset that being based on secondary data analysis any analytic bias present in the original reports cited, will to some extent be duplicated here. Every effort has been made to acknowledge alternative perspectives where appropriate. It is also acknowledged that
current practice has evolved and in many instances has improved. Earlier risk communication strategies however remain relevant within an evaluation of SARF.

LAYERED DATA COLLECTED IN RELATION TO HIV/AIDS

What Is HIV/AIDS?

Acquired Immune Deficiency Syndrome (AIDS), the syndrome that damages the body’s immune system, was first reported in the UK in 1981, with the first death from AIDS in the UK occurring in 1982 (Wellings, Orton, & Samuels, 1988). The retrovirus which causes AIDS was discovered in 1983 and in 1986 was termed Human Immunodeficiency Virus (HIV) (Berridge, 1996). Once infected with HIV the person carries the virus and remains infectious for the rest of their lives. People with HIV usually have no symptoms for a prolonged period of time while the virus acts slowly to weaken the body’s immune system. When a person’s immune system has broken down, s/he is susceptible to ‘opportunistic diseases’ such as infections and cancers that are not normally a threat to a healthy person. When this happens the person is said to have AIDS.

There is currently no vaccine or cure for HIV. However, highly active antiretroviral treatment (HAART) suppresses the HIV virus and can reverse the damage to the immune system, thus prolonging the lives of those infected. However, the virus is continually changing, sometimes becoming resistant to current drugs. Thus, any treatment may not be a long-term solution.

HIV is passed on from an infected person through the transfer of body fluids, such as blood, semen, vaginal fluid and breast milk. HIV can be passed on therefore by having unprotected vaginal or anal sex with an individual who has HIV, by using needles or syringes that are infected with HIV, and from a HIV+ woman to her baby during pregnancy, at birth or through breastfeeding. HIV is not transmitted through everyday social contact with an infected person.

Organisations

Risk communication in relation to HIV/AIDS in the UK has taken place within a complex organisational context.
The Communicable Disease Surveillance Centre (CDSC), part of the Public Health Laboratory Service (PHLS), was set up in 1977 following an outbreak of smallpox at the London School of Hygiene in 1973. AIDS surveillance in the UK was begun in 1982. From 1986, the World Health Organization (WHO), founded in 1946, had the lead responsibility on AIDS in the United Nations, helping countries to set up much-needed national AIDS programmes. The WHO’s Global programme on AIDS was established in 1987 and has become a crucial force in legitimating an international policy ethic that stressed confidentiality, opposition to stigmatisation and respect for individual human rights.

For years, the WHO had led the international campaign against AIDS. However, by the mid-1990s it became apparent that the spread of HIV, and the epidemic’s devastating impact on all aspects of human lives, and social and economic development, were creating an emergency that would require a greatly expanded United Nations effort. The WHO global programme on AIDS was closed as a result at the end of 1995. The UN took an innovative approach in 1996, drawing six organisations together in a joint and co-sponsored programme, the Joint United Nations Programme on HIV/AIDS (UNAIDS). The six original Co-sponsors of UNAIDS - UNICEF, UNDP, UNFPA, UNESCO, WHO and the World Bank - were joined in April 1999 by UNDCP. The goal of UNAIDS is to catalyse, strengthen and coordinate the expertise, resources and networks of influence that each of these organisations offer.

The European Centre for the Epidemiological Monitoring of HIV/AIDS (CESES in French), a WHO and EU collaborating centre, was set up in 1984 upon the request of the French Ministry of Health and WHO. The Centre’s activities include HIV/AIDS surveillance in Europe.

The Health Education Authority (HEA) was founded in 1987 as a special health authority, and was largely funded by the UK government’s Department of Health. In the UK, the Health Education Authority (HEA), was the principle body responsible for the prevention of HIV/AIDS through public education and health promotion. Their remit was to develop and implement health education interventions aimed at specific audience groups. In December 1986 the British government launched its first television advertising campaign on HIV/AIDS. The HEA took over direct responsibility for HIV/AIDS public education from the Department of Health in 1987 and undertook extensive advertising, press and publicity activity aimed at increasing and maintaining public knowledge and awareness of HIV/AIDS, stimulating and sustaining safer sex practices, and influencing the climate of public opinion to increase the effectiveness of other HIV/AIDS prevention initiatives. The impact of these campaigns were monitored (see below). The HEA closed on March 31, 2000 and was replaced by the Health Development Agency (HAD) on April 3, 2000.
The analysis of Miller and Williams (1998a) highlights the process of producing advertising and educational materials for health education campaigns. They note that this was characterised by a large number of government departments, individual ministers, non-governmental organisations, advertising agencies, market research companies. The situation was further complicated by changes in which institutions were responsible for campaigns as well as by changes in key personnel within organisations. However, they suggest that it was not simply institutional discontinuities that led to the production of text that was internally contradictory. Government intervention was often driven by political and personal sensitivities about public and government reaction. Internal divisions, mistrust between and within departments, different approaches to health education and unwieldy chains of decision making all contributed to this. The communication between the various stations of amplification are thus characterised by processes of conflict and negotiation. The evidence presented by Miller (1998b) is that these processes resulted in public confusion and misunderstanding. In contrast to this analysis, it might also be argued that it was the prompt and appropriate early response of the Government in promoting needle exchange schemes and open access GUM clinics that contributed to maintaining the UK rate of HIV at a much lower level than in other European countries¹.

However, it is clear that organisational management of such risk issues are likely to affect processes of risk amplification. It is thus vital that SARF can incorporate a more coherent consideration of these processes. The issue of power is also crucial in considering why some stations of amplification are able to carry more weight than others in decision-making processes. Consideration of these issues is also vital to determine practical guidelines for developing for risk communication initiatives where the possibilities for diffusion or overlapping responsibilities exist.

¹ Personal communication from DH
Incidence/prevalence of HIV/AIDS

The first level of data collected relate to the incidence and prevalence of HIV and AIDS and how these have changed over the last 20 years.

Epidemiological surveillance of AIDS began at the Public Health Laboratory Service (PHLS) AIDS Centre in collaboration with the Scottish Centre for Infection and Environmental Health (SCIEH) in 1982. Surveillance of HIV infection commenced in late 1984 when blood tests for HIV became available (PHLS, 2000). Since October 1985 testing for HIV has been available for routine clinical use.

AIDS

By the end of 1999, the total number of AIDS cases reported in the United Kingdom since the creation of the surveillance system in 1982 was 16,813, 11,715 of whom (70%) are known to have died. With this figure, the UK ranks fifth among European countries, after Spain (54,964), France (49,421), Italy (44,516), and Germany (18,239) (CESES, 1999). A comparison between the rates of incidence per million inhabitants in 1998 shows that the United Kingdom ranks seventh, with a rate of 13.9 per million, after Spain (89.8 per million), Portugal (88.5 per million), Italy (42.4 per million), France (30.2 per million), Luxembourg (21.8 per million) and Denmark (14.2 per million).

HIV

Since reporting began in 1984, 40,312 first HIV diagnoses have been reported, including 37,480 in England, Wales and Northern Ireland, and 2,832 in Scotland (CDSC, 2000Communicable Disease Surveillance Centre). However, a substantial amount of HIV remains undiagnosed. It is estimated that one third of HIV infected individuals do not know that they are HIV positive (PHLS, 2000).

PHLS figures show that in 1999 Britain will have the highest number of new HIV diagnoses in the past decade by the time all new cases are reported from around the country (see Figure 1). A similar situation was found world-wide.
A decline in the number of new AIDS cases is evident in all transmission groups (Figure 2), although heterosexual contact accounts for an increasing proportion of AIDS cases and is about to become the predominant mode of transmission among new AIDS cases (CESES, 1999). 47% (11,257) of reported AIDS cases were ascribed to sex between men, 45% (2,968) to sex between men and women, 5% (1,061) to intravenous drug use, and 3% (340) to materno-foetal transmission (PHLS, 2000).

This decline in AIDS incidence is largely attributable to the effect of the introduction of highly active antiretroviral therapy (HAART) in delaying the onset of AIDS in those whose HIV infection is already recognised, and in delaying death in those who had already developed AIDS (CESES, 1999)² (PHLS, 2000). Figures collected by the PHLS show that the steep downward trend in AIDS deaths between 1995 and 1997 ostensibly attributable to the introduction of dual therapy and HAART combination therapies in 1994 and 1996 respectively, has slowed over the two subsequent years (see Figure 1). It has been suggested (Nicoll, 2000) that many of these deaths occur in people who are diagnosed at the time they become sick with AIDS when it may be too late for them to benefit from the new drug therapies. Alternatively, it may represent cases in which drugs are not effective, perhaps because of the development of resistance.

---

² HAART was introduced in 1996 and typically refers to a potent combination of 3 antiretroviral drugs (e.g. two nucleoside analogue reverse transcriptase inhibitors (NRTIs) and a protease inhibitor or non-nucleoside RTI). Dual (combination therapy (two NRTIs) was introduced earlier, c 1993/94. Personal communication, DH.
Figure 2: UK AIDS cases by year of diagnosis and exposure category

Source: PHLS, 2000

Modes of transmission

Sex between men was the leading mode of HIV transmission until 1998, both in terms of its proportion of all diagnosed infection (59%) and the proportion of prevalent diagnosed infections (63% at the end of 1998) (CDSC, 2000). However, the relative percentage of cases of AIDS in homosexual men has declined steadily over the last years (see Figure 2). Figure 3 gives a yearly breakdown of deaths from AIDS by exposure category. For the first time ever, in 1999 more heterosexual people than homosexuals were infected with the HIV virus (Figure 4). PHLS figures showed 1,070 new HIV diagnoses of heterosexuals compared to 989 new infections among gay men. Most of the new heterosexual infections have been reported among people who are from or have spent time in sub-Saharan Africa, where AIDS has taken the strongest hold (CDSC, 2000).
However, it is also likely that the crossover between HIV diagnoses for heterosexual individuals and homosexual men is in part due to the activity of various stations of amplification. A Department of Health directive instituted the promotion of ante-natal HIV testing which have increased both the number of women being tested and new diagnoses. Similarly, increases in diagnoses may in part result from the increased numbers being tested for HIV and AIDS in response to campaigns that encourage this.

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**Figure 3**: Deaths in AIDS cases by exposure category and year of death

![Graph showing AIDS deaths by category and year](source)

**Figure 4**: HIV infected individuals by year of diagnosis and exposure category

![Graph showing HIV infections by category and year](source)

---

3 A Health Service Circular [HSC1999/183] issued by the Department of Health in August 1999 set out targets for offering and recommending antenatal HIV testing in all health authorities in England with the aim of reducing by 80% the number of children acquiring HIV infection from an infected mother during pregnancy, birth or through breastfeeding by the end of 2002

As a result of DoH initiative noted above, one should see more HIV in women. Indeed, Figure 5 shows that heterosexually acquired HIV infections are more prevalent amongst women than men, a trend that has become more pronounced since 1992. This may be explained in part by the institution at a local level of voluntary antenatal HIV testing at the beginning of 1995. The graph also indicates that whilst heterosexually acquired HIV has decreased among men in 1999, it has increased amongst women.

**Figure 5: Heterosexually acquired HIV infection by gender and total incidence**

![Graph showing heterosexually acquired HIV infection by gender and total incidence.](image)

Source: PHLS, 2000

**HIV testing:**

**Figure 6: HIV tests according to exposure category June 1989 - June 1997**

![Graph showing HIV tests according to exposure category.](image)

Source: PHLS, 2000
Figure 6 shows the breakdown of HIV tests by risk groups. Probably the most notable element of this is the high uptake of tests by those who are classified as being no risk.

However, Figure 7 also indicates that heterosexual men were consistently more likely over the years to have HIV tests than women.

To break this down further, Figure 8 shows that this was the case in two of the three risk categories: ‘no risk’ and ‘many heterosexual partners’. For those classified as having ‘heterosexual high risk partners’ more females volunteered to be tested than men. It is notable that in the ’no risk category’ that initially more men than women were seeking HIV tests. Over the years this discrepancy has increasingly disappeared.

Source: PHLS, 2000
Clinical attendance for HIV-antibody testing can be used as a proxy measure of the level of public awareness of HIV and AIDS (Griffith et al., 1995). Clearly there is substantial variability across time as well as within risk groups. This is evident both in Figs 6 and 8. However, despite this variability both across groups and within groups across time, there is often a similar pattern in terms of the peaks and troughs of HIV test uptake.

Condom data and HIV/AIDS

Modification of the behaviours that influence HIV transmission has formed the basis of risk reduction advice to the general public (Wellings, 1994). The two messages that have predominated in HIV/AIDS education have been the use of a condom and the restriction of the number of sexual partners. However, epidemiological evidence suggests that it is not primarily the number of sexual partners that creates the risk of infection but rather the exchange of bodily fluids in unprotected sexual intercourse (Goodrich, Wellings, & McVey, 1998). An increase in condom use, therefore, has been seen as a positive sign of the impact of HIV/AIDS public education.

The HIV/AIDS evaluation literature, e.g. Wellings, (1994) contains several examples of condom sales figures being used as objective measures of behavioural changes. The data shown in Figure 9 relate to condom sales for the whole UK market, not one particular manufacturer. This shows that there has been a steady increase in the number of condoms

Source: PHLS, 2000
sold in the UK since 1983. In order to control for concurrent increases in the population, the graph also includes annual population figures for the total UK population and several age groups. The figure shows that the rise in condom sales cannot be explained by a growth in retail power due to an increase in the total UK population, or indeed in terms of an increased population of young people or people most likely to be sexually active. This increase in condom sales may be therefore due to other factors, and the media and education campaigns are likely to have been influential in this respect. This is supported by the observation that a sudden rise in condom sales occurred in 1986/1987 which coincides with the first government HIV/AIDS education campaign started in 1986.

Figure 9: UK annual condom sales by UK total population and 16-30 year old population

![Graph showing UK annual condom sales by UK total population and 16-30 year old population]

Source: LRC Products Estimates, 1998

However, an important issue in relation to condom sales data is that little is known about what happens to condoms once they are bought, i.e. whether they are used or not, since only the volume of condoms is being measured (Goodrich et al., 1998).

Public education campaigns/media events

In 1986, the Government ran the first public HIV/AIDS awareness campaign through the Department of Health. The campaign used television and posters, supported by a leaflet containing the facts about HIV and AIDS that was distributed to all 23 million households in the UK. The purpose of the campaign was to increase awareness and provide the general public with basic information about HIV/AIDS. In 1987, responsibility for HIV, AIDS public education was handed to the newly formed Health Education Authority (HEA). Their remit
was to develop and implement health education interventions aimed at specific audience groups. It undertook extensive advertising, press and publicity activity aimed at increasing and maintaining public knowledge and awareness of HIV/AIDS, stimulating and sustaining safer sex practices, and influencing the climate of public opinion to increase the effectiveness of other HIV/AIDS prevention initiatives. As well as general campaigns, others were targeted at more vulnerable groups (gay men, African communities) The HEA closed on March 31, 2000 and was replaced by the Health Development Agency (HAD) on April 3, 2000.

Media campaigns and media events aimed at HIV prevention and safer sex running between 1986 and 1996 are shown in Table 1.

Table 1 – Summary chronology of Department of Health and Health Education Authority’s mass media campaigns on HIV, AIDS and sexual health for the general population

<table>
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<th>Date</th>
<th>Campaign</th>
<th>Target</th>
<th>Media</th>
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</thead>
<tbody>
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<td>Mar’86</td>
<td>DoH</td>
<td>General</td>
<td></td>
</tr>
<tr>
<td>Nov’86</td>
<td>DoH</td>
<td>General</td>
<td></td>
</tr>
<tr>
<td>Jan’87 – Feb’87</td>
<td>DoH: Don’t die of ignorance</td>
<td>General</td>
<td>TV, Press, posters, leaflets</td>
</tr>
<tr>
<td>Feb’88 – Sept’88</td>
<td>AIDS, you know the risks, the decision is yours</td>
<td>General</td>
<td></td>
</tr>
<tr>
<td>Dec’88 – Mar’89</td>
<td>AIDS – you are as safe as you want to be</td>
<td>General public, opinion formers</td>
<td>National Press</td>
</tr>
<tr>
<td>Dec’88 – Jul’89</td>
<td>Safer sex</td>
<td>Gay men</td>
<td>Gay Press</td>
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<td>June’89 – Sept’89</td>
<td>AIDS – you are as safe as you want to be</td>
<td>Young people</td>
<td>Posters, Radio</td>
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<td>Experts campaign</td>
<td>General, Opinion formers</td>
<td>TV, National Press</td>
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<td>Inhibitions campaign</td>
<td>General, Young people</td>
<td>Posters, Radio</td>
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<td>TV, Radio Cinema</td>
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<td>Young people’s press campaign</td>
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<td>Magazines</td>
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<td>Oct’92 – Dec’92</td>
<td>AIDS can affect anyone</td>
<td>Ethnic minorities</td>
<td>Posters, Radio, Press</td>
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<td>Condom normalisation V – Mrs Dawson, Mr Brewster</td>
<td>General, Young people</td>
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<td>Jul’93 – Sept’93</td>
<td>Travel campaign</td>
<td>Young people, international travellers</td>
<td>Radio, Posters at airports</td>
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<td>Sept’93 – Jan’94</td>
<td>Young people’s press campaign</td>
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<td>Magazines</td>
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<td>Jul’94 – Sept’94</td>
<td>Travel campaign</td>
<td>Young people, international travellers</td>
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<td>Jan’95 – Mar’95</td>
<td>Postponement campaign</td>
<td>Young people</td>
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<td>Feb’95 – Mar’95</td>
<td>Winter travel campaign</td>
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<td>Summer travel campaign</td>
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<td>Winter campaign for young people</td>
<td>Young people</td>
<td>Magazines</td>
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Source: (Field, Wellings, & McVey, 1997, Promoting Safer Sex. London: Health Education Authority)

Away from official campaigns, particular media events are related to audience responses. For example, when a central character in the BBC soap opera East Enders was diagnosed as HIV positive, this was followed by the highest ever number of calls to the National AIDS helpline (Kitzinger, 1998a)

**Media coverage**

Government education was not the only source of information available to the public – the most prominent sources of information were the mass media (Beharrell, 1998)
Figure 10 shows that non-news TV programmes peaked in 1987 when the HEA launched their HIV education campaign. However, soon after the major peak in 1987 the number of non-TV programmes decreased drastically, reaching pre-campaign levels in 1990, thus reflecting an almost immediate lack of media interest in HIV.

Source: based on Miller, 1998

Figure 11 shows media coverage of UK national daily and Sunday press from 1988 to 1991 varied considerably. Media coverage of HIV/AIDS showed the greatest peak in the last quarter of 1989 at the time of the Kilbracken controversy. Since the end of 1989, the figure shows that media interest has decreased dramatically, although staying above the initial coverage level in 1988.
Government spending

In Britain, at the end of 1999, prevention initiatives for the population as a whole were conspicuous by their absence, and because there has not been a significant heterosexual HIV epidemic, many health authorities across Britain have sought to ‘mainstream’ their HIV and AIDS work into other programmes and activities (Aggleton, 1999). Specialist HIV and AIDS workers have been encouraged to re-orient their work to address other health concerns, and the AIDS-related voluntary sector faces continuing uncertainty (National AIDS Trust, 1998). In contrast to these perspectives, the DH would point to the maintenance of ring-fenced funding for HIV prevention in the NHS and the guidance issued to health authorities which requires them to spend at least 50% of their special allocations on those groups most at risk of HIV and people who are already infected.\textsuperscript{5}

Following the emergence of HIV as a public health issue in 1984/1985, government spending for HIV/AIDS health education rose dramatically (see Figure 12). Since 1994, however, there has been a steady decline of government money made available to the public health sector.

\textsuperscript{5} Personal communication, DH.
Public perception

In Britain, firm documentation of changes in perceptions/attitudes and self reported behaviour across the life cycle of HIV/AIDS is hard to obtain. At present there is no reliable system for monitoring this in the population in general (Aggleton, 1999). The most comprehensive data in this area was collected in the first National Survey of Sexual Attitudes and Lifestyle (NATSAL).

NATSAL is the largest and most comprehensive survey of its kind ever conducted in the UK. It collected information from 18,876 randomly selected individuals (aged 16-59) in the UK in 1990/1 (Wellings, Field, Johnson, & Wadsworth, 1994; Johnson, Wadsworth, Wellings, & Field, 1994). It was originally to be funded by the government (via ESRC/HEA), but was (reportedly) personally vetoed at the last minute by Margaret Thatcher, Prime Minister at the time. The Wellcome Trust stepped in to provide the necessary funding (£900,000). Ten years on, the Second National Survey of Sexual Attitudes and Lifestyles (May 1999 to April 2002) is being funded by the Medical Research Council and the Department of Health. A random sample of 12,000 men and women aged 16 - 44 and resident in Great Britain will be recruited for a computer-assisted interview. This research aims to provide a detailed understanding of patterns of sexual behaviour in Britain, and assess the changes over the ten years since the first survey in 1990/91. It will provide information to guide health promotion.

\[\text{Figure 12: Expenditure on HIV/AIDS health education (and National Helpline) and voluntary sector}\]

\[\text{Source: DH, 2000 - personal communication}^6\]

\[\text{Figures provided are not on a consistent basis. Before 1996/97 figures include HIV/AIDS health education and sexual health plus some contraceptive education and a proportion of HEA's overhead costs. From 1995/96 National AIDS Helpline combined with contract for National Drugs Helpline and from 1999/00 Drinkline}\]
strategies and service development. Many of the questions are identical to those in the 1991 survey, including age at first intercourse; homosexual and heterosexual sexual experiences; condom use at last intercourse, or among groups closest to the epidemic such as homosexually active men.

There are a many smaller surveys and evaluations of public education campaigns, however these generally deal with changes that occur in responses at a particular point in time, to a particular campaign, or across a relatively short time period. A paucity of systematic and comprehensive evidence in this area makes it very difficult, if not impossible to assess long term trends of perceptions and behaviour in the general public.

Moving away from the general public, in keeping the aim of targeting vulnerable groups, there are several time series surveys of gay men. Monitoring High Risk Sexual Behaviour Amongst Homosexual Men in London is an annual cross-sectional survey conducted by University College London. It aims to maintain surveillance of high risk sexual behaviour among gay men socialising in London and/or using GUM services in London. The survey was first conducted as a pilot within Camden and Islington Health Authority in 1995 and has been repeated annually on a much wider scale covering bars, clubs, clinics and saunas across the capital.

The HEA's gay bar survey has data on the results of interviews conducted with 1800 men between 1986 and 1996 (HEA, 1997).

The most substantial research initiative in this are is part of the Community HIV and AIDS Prevention Strategy (CHAPS). This is a DH funded programme, co-ordinated and led by Terrence Higgins Trust, that has funded the National Gay Men's Sex Survey since 1997. The survey is carried out by SIGMA (Socio-sexual Investigations of Gay Men and AIDS). Last year over 10 000 homosexually active men were surveyed at community events and in bars. However, it is not until the 2000 survey that questions that have been asked in previous years are being systematically repeated. Until these data are published early in 2001, time series data will not be available.

Clearly then there have been a number of important DH initiatives over the lifecycle of HIV/AIDS. However, knowledge in this area is not always comprehensive or reliable and the DH itself has drawn attention to the need for improvements in data collection and presentation.

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7 http://www.natcen.ac.uk/news/news_research_quant.htm#sexatt
8 Information provided by the National HIV Prevention Information Service
9 Information provided by the National HIV Prevention Information Service
10 Personal communication, Terence Higgins Trust
11 Health Update: Sexual Health, HEA, 1997
The latest issue of ‘Current HIV Education Research’ highlights these very issues saying that

“Duplication and lack of coordination in HIV social research is common, and opportunities for a piece of research in one part of England to inform similar work elsewhere are also ad hoc. No fora exist to debate questions of methodology or to debate data sets”

Consequently, in order to more closely track changing attitudes in relation to HIV/AIDS, the intention of this secondary analysis was to identify particular questions that had been asked in different surveys over the years. To this end a search was done to identify published surveys that reported data collected in the UK. The survey questions were entered into a database according to sampling year so that responses on a question could be compared across a number of years. Information about the targeted age group and sample size was also included to that similar data sets could be compared.

However, examination of data sets that were ostensibly comparable revealed that there were generally wording differences between surveys. Obviously, particular questions were also set in different contexts in different questionnaires. These differences are likely to affect responses to particular questions. Furthermore, although the survey questions often had the same response option theme, e.g. agree/disagree, they differed in the number of response options available to respondents. Thus variability in the question responses was, in some instances more likely to be due these methodological artefacts than to changes in the attitudes themselves. Conflating the data in this way would certainly render the two explanations indistinguishable. Even substantial time series data sets compiled by the HEA consistently alert readers to the possibility that results should be treated with considerable caution because of methodological effects (Field et al., 1997). In addition, responses in the area of sexual attitudes and behaviours is particularly likely to be prone to social pressures and social desirability bias (Barnett, 1998).

As a result of these issues, only time-series or longitudinal studies were analysed for changes in the public perception of HIV/AIDS. Although the database consists of numerous longitudinal or time-series studies undertaken by the same researchers/research groups, this did not necessarily mean that the same questions were asked across waves during the same survey. The three studies best suited for further exploration were

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• the HEA/BRMB Aids Strategic Monitor and the HEA/BMRB Communications Monitor which ran between 1987-1991 and 1991 and 1993 respectively;

• the Eurobarometer asked the same questions in 1989, 1990 and 1995;

• the Surrey survey, which asked the same questions in 1989, 1990 and 1991.

These are not directly comparable however insofar as the sample compositions vary: the Surrey research population was only 16-19 year olds.

Data are collected on a number of different parameters, for example, reports of current behaviours, indicators of present levels of worry and concern and beliefs or knowledge about AIDS and HIV. These vary in their applicability to being used to explore SARF.

Managed by the Health Education Authority, the AIDS Strategic Monitor ran from December 1987 to February 1991. After this in October 1991-1993 the Communications Monitor monitored public responses to all HEA campaigns. This included HIV and AIDS campaigns (Field et al., 1997). Base line information was collected on AIDS related attitudes, knowledge and behaviour in 1986. A survey a year later after the first campaign by the Department of Health suggested massive shifts towards more accurate public perceptions.

An analysis of questions that are ostensibly comparable over a longer period of time indicates

• A steady growth in awareness of HIV between 1988 to 1993. These increases were to some extent linked with the content of particular campaigns

• In response to the statement, “I don’t think I will ever get HIV (the AIDS virus)” agreement fell from nearly 80% to 70% over the life of the AIDS Strategic Monitor. There was a further fall to 60% throughout the time span covered by the Communications Monitor\(^\text{13}\). It was concluded that the ‘Personal Testimony Campaigns’ contributed to this decline.

• As far as condom use is concerned, this was an area where there were particular methodological problems. The measure in which most confidence could be placed (i.e. exactly the same question was used with an acceptable sample size) showed that reported condom use increased from 34% in 1988 to 36% in 1989 and 39% in 1991.

\(^{13}\) These were the figures for 16-54 year olds. It should also be noted that until April 1989 the statement referred to AIDS rather than HIV
The most direct indicator within SARF of a trend towards intensification of the risk is arguably found in responses to the question, ‘How much do you worry about AIDS’

Using the Surrey AIDS data set, Fig 13 shows that although overall most people in each of the three years of data collection said that they did not worry much, within each response category the trend between 1989 – 1991 was towards increased numbers of people worrying.

Fig 13: % worrying about AIDS

A similar profile is presented in relation to ratings of how likely people rated themselves to be infected by HIV and AIDS (Fig 14). There was a steep decrease in the percentage of those saying that it was not at all likely that they would be infected by HIV/AIDS. Similarly, there was an increase in those saying that they were not sure whether or not this might happen. Clearly, over the three years there was an increase in the number of people that thought that they may be vulnerable to catching AIDS. These conclusions are comparable with those of the AIDS Strategic Monitor noted above.
This data can be juxtaposed with another type of public perceptions data; that relating to the amount of knowledge that people feel they have about AIDS. The Surrey data suggest substantial increases between 1989 and 1991 in the amount of knowledge that people have about AIDS (see Fig 15); those that considered themselves to have a little knowledge increased from 42% to 71% over this period. There was also an increase in those who thought that they had a great deal of knowledge from 4% to 10.7%.

So, the low but rising levels of concern noted above took place in conjunction with people believing they knew more. Either they felt that what they knew was a cause for concern, or that this knowledge was considered to be unrelated to their risk estimates. It is interesting that there is no evidence over the same period of changes in the knowledge of possible routes of transmission – it might be argued that a ceiling effect was operating here; there
was little room for levels of knowledge to become more accurate. Both the Surrey and the Eurobarometer data would support this conclusion.

It is also important to consider how these perceptions and beliefs relate to behaviour. Between 1989 and 1991 although the percentage of people who intend to use a condom increases over time, the percentage of those who reported using a condom at last sexual intercourse actually decreases over time\(^{14}\). This happens even though the value of condoms is known and the intention to use them is expressed. Condom use also decreased with age. By 20 the sample had had, on average, four sexual partners and the majority knew that each of these had been sexually active previously. Yet, most stopped using a condom early in these relationships. For 16 year olds actions match intentions much better: those saying that they would use condoms actually report using them when they last had sex.

The limited evidence that there is in this area suggest only temporary changes in behaviour occurred, followed by a return to previous practices.(Breakwell & Fife-Shaw, 1991, p.169). Certainly any confidence about a rise in condom use must be tempered by recent figures showing the steady rise in the incidence of gonorrhoea and other STDs suggesting that safer sex is being abandoned.

SARF makes no provision for considering what is driving low but increasing concern, an increasing sense of being vulnerable to the risk of being infected, greater knowledge about AIDS and yet little evidence of appropriate behaviours to avoid infection. The data suggest that what individuals understand as their own capacity to ameliorate the impact of a particular hazard cannot simply be explained by the activity of the relevant stations of amplification (e.g. health education and the media). The low overall level of concern coupled with assessments of increased likelihood of being affected by HIV/AIDS suggests that the disease may have become normalised in the sense that is that there is an general expectation of being affected by the disease that cannot be avoided by actions to counter it. Again SARF is not equipped to illuminate the processes by which a risk may become normalised nor to explain the finding that perceptions of risk had very little impact, direct or indirect, on attitudes, intentions, or behaviours. (Breakwell, Millward, & Fifeschaw, 1994, p. 208).

\(^{14}\) Clearly this differs from the conclusions of the AIDS Strategic Monitor. This may well be due to methodological differences. The two surveys do concur in suggesting that young people were more likely to report using condoms.
INTERACTION OF LAYERS

Some observations can be made concerning the relationships between different layers of data.

Expenditure on HIV/AIDS: incidence of HIV/AIDS and non-news TV

Following the emergence of HIV as a public health issue in 1984/1985, government spending for HIV/AIDS health education rose dramatically (see Figure 12). Since 1994, however, there has been a steady decline of government money made available to the public health sector for health education or promotion. When these trends are considered in relation to the incidence of HIV and AIDS across the same time period (Figure 1), it becomes apparent that at the beginning of the epidemic government spending closely mirrored the actual occurrence of HIV and AIDS in the UK. However, although the steady decline in government spending since 1994 largely reflects the declining trend in AIDS diagnoses and AIDS deaths. It bears no relationship to the incidence of HIV in the UK, which has been steadily rising over the same time period\(^\text{15}\).

When the profile of government spending (Fig 12) is looked at in relation to that of non-news TV programmes on HIV on BBC and ITV/C4, (Fig10) it is clear that both show a similar pattern of peaks and troughs between 1985 and 1990, the rise and fall of each mirror each other albeit with the profile of non-TV news being more extreme. Both indicators show peaks in 1987 when the HEA launched their HIV education campaign.

Whilst these relationships are interesting insights afforded by the layering approach, they immediately beg the question as to why these things are so, what their implications are and where the mechanisms of cause and effect lie? What are the processes that underlie the similar profiles of government spending and non-news TV programmes and what role do these have in the amplification of the HIV/AIDS risk?

Condom sales and HIV testing

The data relating to condom sales and HIV testing are both indicators of HIV/AIDS relevant behaviours and within the SARF would thus fall into the category of behavioural responses. However their profiles are very different. The sale of condoms shows a gradual rise over the period in question (see Fig 9). In contrast, if the quarterly data on uptake of HIV tests (Fig 6) is

\[^{15}\text{It is acknowledged that these do not necessarily represent new infections and will also reflect the contribution of imported infections}\]
conflated into annual uptake figures (Fig 16) for the purposes of comparison with the condom sales data, this shows quite a different profile of behaviours.

From a social psychological point of view there are many reasons why this would be so. However, the point here is that SARF does not provide the tools to explain the variation that may be evident within one single layer of the framework and to explain why indicators may vary in their likelihood/propensity to exemplify particular amplification processes. It also leads to consideration of the possibility that different directions of amplification may be seen at the same time in relation to different behaviours – this is not a possibility that is currently considered within SARF. It is an important possibility to consider however as it links with the notion that some things are easier to change and may be more open to effective risk communication initiatives.

**Incidence of HIV/AIDS: policy and behaviour changes**

Exploring a particular layer of data in relation to different groups is also instructive although once again providing more questions than answers. The number of AIDS diagnoses rose steadily from 1984 for the main risk group of homosexuals (Fig 2). In 1987 the numbers of heterosexual and IDU diagnoses also began to rise, whilst remaining comparatively constant in the other risk groups (Figure 2). After 1994 homosexuals, showed a sudden drop in the number of AIDS diagnoses. The downturn for the IDU group occurs a year earlier and for heterosexuals a year later.
The reasons for this differentiation between groups and the relationship that this bears to the operation of amplification processes is not clear. It may be that it is partly explicable in terms of policy changes – for example dual therapy and HAART (see Footnote 2) were introduced in 1993 and 1996 with HIV+ homosexuals, as the main risk group, initially being the main target group for the new treatment. It may also be explicable in terms of behaviour changes that took place in each group at earlier and different times. The notion that non-homosexual groups evidenced later behaviour changes is consistent with the representation of the disease as a ‘gay disease’: individuals from other at-risk groups may therefore have ignored health warnings, believing themselves to be impossible recipients of the disease.

The issue of the importance of understanding the processes underlying different group profiles is also evident in relation to HIV diagnoses.

As shown by Figure 4, new diagnoses in homosexuals and heterosexuals have shown the greatest variability over the years, with the incidence of HIV in injecting drug users, mother-to-infant and other/undetermined risk group remaining relatively stable and low. The sudden rise of HIV diagnosis in homosexuals in 1985, as compared to 1984, is probably best accounted for by the fact that HIV tests were formally introduced in 1985, thereby capturing undiagnosed HIV infected individuals from previous years. Homosexuals have had the highest incidence of HIV diagnoses, at least until 1999.

The number of new diagnoses of HIV declined for both homosexuals and heterosexuals between 1986 and 1988, from where they steadily rose again until 1990. From 1990 onwards, the number of new HIV diagnoses in homosexuals declined gradually, a trend that has been accelerated since 1996. Conversely, the number of new HIV diagnoses in heterosexuals showed a gradual increase over the same period, accelerated in 1996, and in 1999 has become the prevalent mode of HIV transmission in the UK. Again, it is vital to understand the processes that underlie these changing group profiles.

**Diagnoses/ death from AIDS**

Both deaths from AIDS and diagnosed AIDS cases peaked in 1994 (see Figs 2 and 3). The pattern of heterosexual deaths and diagnoses are also similar to each other. However, overlaying the two graphs in relation to the last few years suggests what might appear to be an important change in the pattern. Homosexual and heterosexual deaths from AIDS in the UK are now falling at essentially the same rate, that is the two lines are running parallel to

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16 It is therefore questionable to what extent 1985 figures are truly representative of new HIV diagnoses for that year and HIV figures for the earlier years of HIV incidence should therefore be interpreted with caution.
each other. However it appears that diagnoses of homosexual AIDS are falling more steeply than for heterosexuals and if the present trend continues for the first time ever more heterosexuals than homosexuals will be diagnosed as having AIDS in 2000. This would reflect the same crossover that has already happened in relation to HIV diagnoses (see Fig 4). The increased number of diagnoses for heterosexual HIV and AIDS is a reflection of what is happening in the rest of the world, where heterosexually acquired HIV is by far the most prevalent mode of transmission (WHO, 1999).

Again the layering method raises questions, answers to which are vital for effective risk communication. It might be hypothesised that these figures and the way in which they are communicated have the potential to constitute a critical point in the representation of the disease. Any shift in the representation of AIDS from a homosexual disease to a heterosexual disease has implications for risk communication strategies and their likely effectiveness.

Volume of media coverage and incidence of HIV/AIDS

It is instructive to consider both AIDS and HIV incidence in relation to the amount of media coverage. In relation to non-news programmes on HIV/AIDS (Fig 10) both BBC and ITV/C4 coverage peaked when the actual incidence of HIV was declining (1986-1987). There was a similar lack of correspondence between this indicator of media coverage and actual incidence of AIDS / number of AIDS deaths because both were steadily increasing until the mid 1990s whilst media coverage showed a great variability in the number of articles over the same time period. This is not a new finding – the layering method in this instance supports previous findings in this area. The lack of correspondence between objective indicators of the risks and the amount of media coverage has been noted in relation to HIV/AIDS in the USA (Rogers & Chang, 1991). It points to the importance of considering of further understanding the decision-making processes within the media about what is to be reported.
Media volume and HIV tests

The overlay of amount of media coverage of UK national daily and Sunday press (Fig 11) with the number of HIV tests (Figure 6) shows that both show almost similar peaks and troughs, with HIV tests displaying the same peaks as media coverage with a quarter’s delay. That is for the 3 clear peaks of amount of media coverage (89/Q4, 90/Q4 and 91/Q2) there were also peaks in the numbers of HIV tests (90/Q1, 91/Q1 and 91/Q3).

Again the layering the data is interesting and in this instance is certainly suggestive of a clear relationship between the amount of media coverage and a variable which can be taken as a measure of public awareness. It also raises the importance of understanding the role of time in relation to different amplification processes. However again, from within the framework we are not equipped to specify the processes that might be responsible for this correspondence or to suggests patterns of cause and effect.

Media content, HIV tests and public perceptions

The number of HIV tests performed at 17 UK laboratories were originally presented in Figure 6. In Figure 16 these are re-presented in relation to the major media health education campaigns.

Previous studies have suggested that the peaks of HIV tests (Oct 1986 & March 1987) coincide with or directly follow health education campaigns (Beck et al., 1987; Beck et al., 1990; Ross & Scott, 1993). It was also observed that in the months subsequent to the period of maximum media exposure on HIV/AIDS, there was a fall in the number of tests performed, although the average during this period remained above that for the period preceding the media campaigns. Although the observed correlation between health campaigns and uptake of HIV tests may have been valid for the early years of the campaign, Figure 16 indicates that there is no clear relationship between health education campaigns and an increase in the number of HIV tests. Furthermore, a decline in the number of HIV tests did not generally coincide with an absence of media campaigns. One possible explanation for this finding is that in later years health campaigns either tended to be constant and their messages repetitive (Personal testimony & condom normalisation, Table 1) or highly variable with multiple target groups. Thus the layering of these data suggests that multiple hazard notifications may lead to different amplification processes. That is later hazard notifications are associated with the risk being normalised to a greater extent. The Main report notes the importance of such hazard sequences.
Ross & Scott (1993)) also suggest that the medium used for the health education campaign affects the strength of the relationship with HIV tests. These studies found that campaigns that used television as their main medium correlated more highly with increased numbers of HIV tests than campaigns using other media such as newspaper adverts and posters. As shown by Figure 17 (orange shade = TV, grey shade = other media), initially there does appear to be an association between use of TV as a medium and increased numbers of HIV tests. However, there were similar peaks in HIV testing after 1993 when TV campaigns had stopped and had been replaced solely by radio and magazines advertisements. Hence, there appears to be no simple relationship between the reuptake of HIV tests and the type of media used in health education campaigns. As far as public perceptions are concerned, Field (1997) notes that television advertising had considerably more impact on awareness than did press advertising. It is interesting from the perspective of SARF that Field et al also suggest that

“people may, in the absence of any visible signs of the disease, use high levels of media activity as some proxy measure of the scale of the problem” (p.31)

Other events communicated through the media were gathered from various HIV/AIDS timelines (e.g. AVERT) and mapped against the peaks and troughs of HIV test numbers (e.g. Freddy Mercury’s death in December 1992; heterosexual celebrities publicly revealing their HIV+ status), thus encouraging people to come forward for testing (Figure 17). The screening of a number of television documentaries about HIV and HIV storylines in television dramas and films, involving heterosexually acquired HIV infection, have been reported to encourage people to come forward for testing (Ross, 1993).

Because of the likely impact of the BBC soap opera Eastenders on the number of HIV tests when it developed its HIV storyline in autumn 1990, the Eastenders website (http://www.walford.net/EastEnders/arc_nf.htm), detailing every episode, was searched for further developments of the story over the years. Although some of the HIV episodes coincided with some of the peaks of HIV tests (June - July 1996), there was no overall trend of increases in HIV tests coinciding with the storyline.
Overall, though it could be argued that the number of HIV tests may be more affected by these events than by health education campaigns. The two largest peaks for testing occurred in December 1990, when the television series *Eastenders* featured a heterosexual character with HIV, and December 1991 when the rock singer Freddy Mercury died from AIDS. Both these events had extensive media coverage. Conversely, the most drastic decline in the number of HIV tests occurred in the ‘no risk’ group in Autumn 1996 following the news coverage of the controversy about faulty antibody tests used by the NHS, which led to false negatives. Clearly this affected public confidence in HIV tests. However, there are other peaks in HIV testing uptake that cannot be related to any particular media event.

What explanation does the SARP suggest lie behind these figures? To what extent is it possible using SARP to explain these variations in the public awareness of HIV and AIDS?

The exploration of the relationship between the patterns of uptake in HIV testing uptake and media coverage is not suggestive of a straightforward relationship. There are some peaks that would clearly seem to be related to the coverage of particular incidents, however there are other peaks where there appears to be no such correspondence. There would appear to be substantially less correspondence between the public health campaigns and clinical attendance for HIV testing.

As far as direct measures of public perception are concerned, certainly increased awareness of AIDS/HIV increases over the series of advertising campaigns (Field, 1997). However, there is no evidence that this results in long term behaviour change in terms of having safer sex.

It would misrepresent the authors of SARP to say that they suggest a simple relationship between media coverage and measures of public perception and awareness. They do not. They draw attention themselves to the way in which high levels of media coverage are not always related to public concern (Kasperson, 1992). However, what is necessary within the framework and what is currently lacking is a consideration of the processes that drive the variety of relationships that can exist between the media and public perceptions. This question is dealt with in the literature, although outside SARP, by the Glasgow Media Group. Their concern (Kitzinger, 1998b; Kitzinger, 1998a) is with how the media has an effect. They suggest that in order to answer this it is necessary to ask a series of supplementary questions

“What factors influence the acceptance or rejection of a specific message? Why do some media messages mobilise public action and others do not? What do people bring to their understandings of AIDS? How are audience responses to AIDS media
messages related to the broader cultural context and to people’s socio-demographic positions and political identities?” (Kitzinger, 1998a)

These questions draw attention to the necessity of considering the processes that mediate the content of the media and the understanding of individuals or groups. Kitzinger and colleagues approach this issue by picking several of the themes contained in the media and within focus groups explore how people accept and reject the messages and how they incorporate these with their own understandings which may contain contradictory and complementary elements.

Attention to the underlying processes is also necessary in explaining how these overall patterns are differentiated in relation to risk groups. Why do some groups show greater variations in concern or awareness than others? How, if at all, are these related to the media? What is it that drives the ‘no risk’ group to seek HIV tests?

EVALUATION OF SARF AND THE LAYERING METHOD

In endeavouring to use the layering method in relation to the lifecycle of HIV/AIDS a variety of secondary data sources have been accessed. Data were collected that represented a number of the constructs of the framework. An exploration of each of these layers and of the relationships between them leads to a number of conclusions.

Even if the data that were collected fulfilled the necessary criteria for truly layered data, SARF has little to say about the questions that should be asked of this data. Although the framework itself facilitates and encourages the collection of layered data, SARF does not hypothesise where cause and effect might lie. Indeed the framework itself is not capable of generating specific questions concerning the relationships between different layers of data. Because of this the framework has little of the predictive power necessary to increase our understanding of the dynamics of risk impacts and how these can be affected by risk communications. As it stands at the present time then SARF is unable to assist in the asking or answering of questions that will have specific policy implications.

The above criticisms are based on the assumption that the appropriate data (i.e. at different levels and over time) are available. However, in relation to HIV/AIDS, an area where a huge amount of research has been commissioned over the last two decades, it is still not possible to align data representing different constructs in the framework over substantial periods of time.
As mentioned earlier, firm documentation of changes in perception/attitudes and self-reported behaviour over the years is difficult to obtain. For an analysis of public perception, 52 surveys of HIV/AIDS from 1981 to 1999 were collected. These studies not only varied in the number of questions they asked and their response options, but also in terms of their sample size, ranging from anywhere below 500 to over 5000. Similarly, only 13% (7) of these studies reported data over two or more data points, albeit not necessarily asking the same questions over time. Comparability across surveys and over time was therefore greatly limited.

Information on media responses, newspapers and television, is similarly scanty and hard to obtain. Only two studies relating simply to the UK systematically explored media representations of HIV/AIDS over a period of time. The data here covered the years 1984-1990 and 1988-1991 respectively.

Having said this, the layering approach that is arguably implicit in SARF has produced a number of insights into the relationships between different constructs in the framework. This is indicative of the potential that the method has for developing a much more coherent understanding of amplification processes. The questions raised by the layering method in relation to the interactions between different levels of data raise important questions about the processes that drive amplification of a risk.

The layering method has suggested the importance of a number of relationships that SARF suggests contribute to risk amplification. However, in each of these cases there is no indication of the processes that underlie them. For example, there appears to be a positive relationship between government spend and the amount of non-news programmes on TV. SARF does not assist in hypothesising as to the cause of this relationship or in delineating the processes that are responsible. Similarly there are no clues within SARF as to why two behavioural responses to the risk event, i.e. wearing condoms and seeking HIV tests should show very different profiles over time. Other data suggest very different profiles for groups that are in different risk categories. This is the case in relation to AIDS diagnoses, HIV diagnoses and the numbers seeking HIV tests. What are the processes responsible for these group differences?

Explanations for all these relationships are likely to involve processes that are situated at different levels of analysis (Breakwell et al., 1994). Some explanations are more likely to recourse to intra-psychic and interpersonal dynamics; others to institutional affordances, other explanations require consideration of ideological and social representational structures.
How might changes in the nature of the hazard itself (for example in relation to medical advances delaying the onset of AIDS) affect representations of the disease and relevant health behaviours? SARF does allow in theory for feedback of amplification processes into the hazard event itself so that the objective level of risk that it poses can actually change. However, the way in which this might happen is not theorised, neither is the way in which the new cycle of amplification processes that is then precipitated is similar to the first one. This can be illustrated in relation to HIV/AIDS. It can be suggested that the nature of the hazard itself has to some degree changed as a result of amplification processes. That is, research that has been commissioned has led to medical advances. The application of these has led to the development of new interventions that in turn can affect the nature of the disease in that the prognosis changes and resistances may develop to particular forms of treatment/interventions. Arguably a new cycle of amplification then starts with perceptions and behaviours that, for some groups at least, are constructed in relation to the new hazard status. The introduction of Highly Active Anti-Retroviral Therapy (HAART) has created new challenges (Aggleton, 1999), including the extent to which perceptions of the ‘treatability’ of HIV/AIDS impact on the practice of safer sex. In the US, Australia and France, there is evidence that this has led to increased optimism about treatment of AIDS. Although no studies have formally assessed this in the UK anecdotal evidence suggests that there has been a change in the beliefs of homosexual men. Ward (1998c), reported the circulation of beliefs that HIV is treatable and therefore there is no need for safer sex; that even if current treatments are not perfect, they soon will be; and that most people with HIV are being treated and so are not infectious.

Other questions that the current case study prompts include the following.

- How do changing profiles of diagnosis of the disease within different groups affect representations of the disease for example in relation to the possible movement away from AIDS being seen as a gay disease?
- How can the effects of policy changes and the way in which these differentially affect risk groups best be monitored?
- What is the role of the creative media in establishing and changing attitudes and behaviours in relation to AIDS? How are decisions in this part of the media made about how particular risks should be represented?
IMPLICATIONS FOR GOVERNMENT

What implications does this case study have for the developing risk communication?

One important aspect of developing persuasive messages is that they should be coherent and consistent. This is not a simple matter particularly in the light of the necessity of tailoring these messages and the images they embody to the norms of different groups. It has been suggested that mixed messages in relation to HIV/AIDS emanated from an organisational context where responsibilities were often unclear. Where responsibilities apparently were clear, decisions of those who were apparently responsible were overruled, not put into practise or contested (Miller and Williams, 1998). Blurred boundaries and lack of coordination between organisations, departments and individuals militate against the development of flexible, proactive and responsive procedures for managing risks.

Secondly, since 1994 there has been a steady decline in government spend on health education and promotion which has coincided with a steady rise in the incidence of HIV. Although as has been noted, there is no simple relationship between these factors, it does raise questions about the efficacy of the interventions and education that the spend funded as well as about the rationale for reductions in spend. There is no evidence that the government spend on health education in relation to HIV/AIDS has resulted in the required behaviour changes in relation to having safer sex. The layering data in relation to condom use is equivocal, however HIV diagnoses are rising as are the incidence of sexually transmitted diseases. Behaviour changes that would be expected in line with the safer sex messages and in line with increased assessments of the likelihood of contracting AIDS have not been forthcoming. One explanation for this is that the expenditure led to messages that were inappropriately conceived and targeted. This possibility would seem to be more applicable to the campaigns between 1986 and 1990 and less so since publication of the Governments HIV health promotion strategy in 1995 when health promotion messages have been targeted, evidence based and pre-tested to a much greater degree\(^\text{17}\). However an alternative explanation is that this may be indicative of some sort of reactance to the risk communication messages. Within SARF this might be conceptualised as resistance to the endeavours of government agencies to de-attenuate. That is, such agencies were attempting to bring behaviours in line with expert assessments of the risk. This meant heightening perceptions of risk and/or to bring safer sex behaviours in line with these expert assessments. By and large this has not happened. The exact nature of the processes that

\(^{17}\) Personal communication, DH.
underlie this should be clarified and addressed; if there is any element of reactance of the part of the public, the continuing upward trends in heterosexual HIV diagnoses and STD’s cannot simply be addressed with a coherent risk communication programme.

Thirdly, it has been suggested that in conjunction with a consideration of the processes that drive risk amplification, the layering method can enable a much more coherent understanding of amplification processes. In order that this data can be collected in a systematic way over time and yet remain an economically viable exercise, consideration should be given to identifying key measures that can track amplification. What are the questions that might best operationalise the key indicators and drivers of risk amplification? Is it necessary to reflect all the constructs that SARF outlines or might some of these prove to be redundant? Such core questions could be included in a variety of surveys commissioned by relevant government agencies. This would go some way to reliably assessing change over time and differences between groups in risk amplification. It would also allow consideration of the effect of placing questions in different contexts within a questionnaire.
Reference List


Figure 16: HIV tests by health education campaigns, June 1989 – June 1997
Figure 17: HIV tests according to exposure category June 1989 – June 1997
THE AMPLIFICATION OF RISK:
BOVINE SPONGIFORM ENCEPHALOPATHY

INTRODUCTION

Bovine Spongiform Encephalopathy (BSE), is certainly the most significant and high-profile risk issue of the last 15 years and arguably one of the most dramatic risk crises of the 20th century. The nature of the disease itself as well as the risk communications that it has engendered have been extensively discussed, not least within the confines of a public inquiry. This report however, has a very specific purpose. It attempts to situate the lifecycle of BSE within the analytic perspective afforded by the Social Amplification of Risk Framework (SARF). The way in which this is done is stimulated by the use of the layering method (both SARF and the layering method are outlined in Annex 1). Secondary data have been gathered that represent various aspects of the framework. These layers and the way in which the various levels relate to each other will be described. Other literature that relate to these levels and their interactions will be incorporated within this analysis.

The aim of doing this is to evaluate SARF and assess its applicability to risk communication initiatives. In doing this, any insights that this new perspective gives on BSE itself will also be noted.

BSE, one of a class of diseases called Transmissible Spongiform Encephalopathies (TSEs), is a disease of cattle first identified in November 1986 by the Ministry of Agriculture, Fisheries and Food (MAFF) at the Central Veterinary Laboratory, Weybridge. It was designated as a notifiable disease in June 1988 (Maxwell, 1997). BSE is characterised by abnormal neurological symptoms, and as yet there is no effective treatment or cure (MAFF, 2000). The average incubation period of BSE is five years, and only very rarely do animals under three years of age display any symptoms. The BSE epidemic reached its peak late in 1992 but since then the number of cases has decreased.

The government introduced a number of measures to protect animal and human health. For example, since BSE is believed to have been caused by contaminated animal feed, the government introduced the Feed Ban in July 1988 to prevent the incorporation of potentially infectious material into ruminant feed, and so prevent cattle that were not already infected from becoming infected (MAFF, 2000). Also in
1988, the UK government introduced legislation that required all cattle suspected of suffering from BSE to be destroyed and sent for diagnosis. Since 1989 controls have existed that ban from the human food chain tissues that are known to, or might potentially, harbour detectable BSE infectivity in infected animals (MAFF, 2000). For example, in late 1989 a total ban on using specified bovine offal in human food was introduced (Harris & O’Shaughnessy, 1997b). From 1990, such controls have also applied to animal feed and from 1997 to cosmetic, pharmaceutical and medical products. Furthermore, in December 1997 the government introduced a ban on bone-in beef and beef bones. These regulations were created to protect public health from BSE infectivity, which has been linked to cattle bones. This ban on retail sales of bone-in beef was lifted in 1999.

Although the government had consistently stressed the safety of British beef, in March 1996 the possible link between BSE and the human disease Creutzfeld-Jakob Disease (CJD) was announced. This led to a significant loss in consumer confidence in beef in the UK and throughout Europe. In March 1996, the European Union introduced a ban on the export of any UK beef and beef products. This has had serious impacts on the entire beef sector and has resulted in financial hardship for farmers and for those engaged in related businesses (Harris et al., 1997b)

KEY POINTS FROM THE CASE STUDY

- The layering method has yielded a number of useful insights into the lifecycle of BSE
- Overall there is considerable evidence that the hazard notification of 1996 did constitute a critical point in the lifecycle of BSE. However, this relationships between key variables are considerably more complex than SARF would suggest.
- It can be problematic to map the concepts of SARF on to variables in a real risk situation
- It is vital to consider the socio historical and political context within which a hazard occurs.
- Self interest can mediate risk amplification processes
KEY LESSONS FOR GOVERNMENT

- The layering method has the potential to constitute a useful diagnostic and evaluative tool.
- A systematic monitoring system of key measures of public behaviour, concern, media interest should be devised.
- Context effects on such measurement tools should also be monitored.
- The nature of the relationship between uncertainty and controversy is a pressing research topic.
- Low generic levels of trust can be overcome. Ways of doing that should be explored.
- Government agencies should manage risk within a climate of flexibility, developing a willingness to be proactive and speedily responsive.
- Proactivity and speed of response are vital in delivering information, particularly in situations of uncertainty.
- Consideration should be given to the possibility of using data generated by the BSE Inquiry to explore the relationship between the regulatory agency and risk amplification processes.

OUTLINE OF REPORT

The structure of this paper is as follows. Firstly the data collected relating to BSE using the layering method will be described. Following this, the insights gained from layering these data will be described. Three key themes emerging from this analysis of the lifecycle of BSE will then be explored. The last two sections of the report will evaluate the value of these findings for SARF and finally note practical implications for the government for the development of risk communication initiatives.

LAYERS OF DATA

Data were collected to represent different constructs within SARF. Details of this data and the time period for which they were available are set against various hazard notifications relating to BSE in Figure 1 (see end of report).
Incidence of BSE

Fig. 2 tracks the numbers of confirmed cases of BSE in cattle from the time when BSE was first identified as an entity to Jan 2000. It shows a sharp rise in the number of cases which peaked in 1992 and then declined sharply. This decline has become more gradual since 1997.

Figure 2: BSE Incidence

MAFF, 2000

Incidence of CJD

Figure 3: Incidence of CJD and number of referrals

Source: National CJD Surveillance Unit (2000)
The National CJD Surveillance Unit (CJDSU) was set up in 1990 in response to a recommendation in the report of the Working Party on BSE. Following this the first cases of deaths from new variant CJD (nvCJD) were identified in 1995 (Fig 3). The highest number of deaths in a year so far was recorded in 1998.

**Government Expenditure on BSE/CJD**

It can be noted that strictly speaking this is not a parameter of SARF. It is quite feasible that it could be used as a Stage 2 measure of impact; similarly it could be considered within Stage 1 of the framework insofar as government departments are social stations of amplification within the framework and responding to the hazard event/notification itself. Whichever, our argument is that government expenditure inevitably has to be looked at when mapping the social impact of any hazard.

The total spend by the British Government (comprising the Ministry of Agriculture, Fisheries and Food; Department of Health, BBSRC and MRC) on research into TSEs to date has been £140 million\(^1\). The general picture here is that the amount of spending in this area has been increasing each year and that this is particularly evident after 1996.

**MAFF**

Up until the end of the 1999/2000 financial year, £76 million has been spent by MAFF on research into TSEs. Funding by MAFF started in 1987. It initially peaked in 1993/4, declining very slightly in 94/5 and 95/6 before increasing sharply every year until 1999/00 (see Fig 4)

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\(^1\) Personal communication from MAFF
In 1996, the then Secretary of State for Health, Stephen Dorrell, asked the Department of Health to provide a programme of Research and Development (R&D) relating to the human health aspects of TSEs. The main research funders were consulted and a research strategy was produced that described the priorities for research and development in the human health aspects of TSE’s. The DH Director of R&D had exercised oversight of all research in this area, particularly working through his chairmanship of the funders group which includes funding bodies such as the BBSRC, MAFF, MRC and the HSE. Each funding body takes forward work most appropriate to its remit as part of coherent programme.

The Department of Health and the Scottish Office Department of Health (now the Scottish Executive Health Department) began funding the National CJD Surveillance Unit (CJDSU) in 1990. The CJDSU investigates the incidence and epidemiology of CJD and the Department also funds associated neuropathological work at the CJDSU. Combined funding of the CJCSU is depicted in Fig 5. Specific research into TSEs was funded primarily by the MRC, BBSRC and MAFF prior to 1993/94 when

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2 Figures provided by the CJD unit at DH. At the time of writing the figures for 96/7 and 97/8 are unavailable.
the Department began to fund research into human aspects of TSEs outside of the CJDSU. Expenditure in this category is also depicted in Figure 5.

![Figure 5: Department of Health funding for the CJDSU and TSE funding outside of the CJDSU](image)

The Department of Health’s position at the present time is that since 1996 they have commissioned, or are in the process of commissioning, over 50 research contracts in the fields of epidemiology, strain typing, diagnostics, blood and blood products and the decontamination of surgical instruments³.

**Media coverage of BSE:**

The main source of information relating to media coverage of BSE is the work of the Glasgow Media Group. Their work maps the coverage in the Guardian and the Observer from July 1987 to June 1996 (Kitzinger & Reilly, 1997, see Fig 6) and in the British National Press from 1988 to 1996 (Fig 7)(Miller, 1999f, see Fig 7). The volume of media coverage of BSE is also profiled against that covering another food hazard – salmonella (Macintyre, Reilly, Miller, & Eldridge, 1998, see Fig 8).⁴

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³ Personal communication from the DH
⁴ Other work tracks media coverage within 1996 in the Financial Times (Dornbusch, 1998)
The pattern of coverage on Figs 6 and 7 (which obviously overlap) is of clear peaks in the amount of coverage in 1990 and then again from 1996. In between these two peaks there are slight increases in the amount of coverage in late 1993 and 1994.

Fig 8 depicts the different patterns of media coverage evident in relation to BSE and salmonella - the previous major food scare. After the peak of coverage of salmonella in 1989 (equivalent in height to the 1990 BSE peak) it tailed off. When
the coverage of BSE was rising sharply the amount of articles reporting salmonella dropped to less than 100 articles per quarter.

Brookes (1999a) notes the role of the media in intensifying public concerns about BSE by highlighting and reinforcing national identities. Much reportage focused upon the way in which BSE constituted a threat to the nation.

**Public perceptions data**

As the time line in Fig 1 makes clear, two types of data related to public perceptions have been collected. Firstly, data obtained via the Meat and Livestock Commission relate to particular questions concerned with meat eating in general, and beef and BSE in particular. These data are available over relatively long periods of time. Secondly, we have had access to two full data sets that included in-depth information about the perceived risks of BSE and other risks. Although containing considerably more detail, they cover much shorter periods of time. A data set provided by the Institute of Food Research includes two data points – both after the March 1996 announcement. The University of Surrey research covered 5 data collection points; three before and two after March 1996. A third, and smaller study of public perceptions is reported by Smith et al (1997a).

Fig. 9\(^5\) shows the percentage of people that are concerned about a variety of food hazards. These data relate to spontaneous mentions of particular hazards and are presented for the first and third quarters of the year between 1990 and 1998. Two particular points can be made. This graph illustrates the way that the levels of concern vary to some extent as a function of the way in which the hazard is defined. The numbers of those expressing concern about ‘mad cow disease’ are always higher than expressed concern about BSE, although this differential is vastly eroded between the first and third quarters of 1996. It is at this point that there are more people expressing concern about BSE. Indeed, the general trend after the 1996 hazard notification is towards less people expressing concern about ‘mad cow disease’. It can be tentatively suggested that this is indicative of a change in the representation of the disease: after the hazard notification linking BSE with CJD for

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\(^5\) Figs 9&10 are from a semi-continuous monitor of women's attitudes to health and diet. Sample size = 900 per quarter.
the first time, much greater concern is expressed in relation to the official scientific name for the disease. Secondly, it is clear that throughout the whole time period there is much more concern about salmonella than there is about BSE. This, with the exception of the first quarter of 1996, is also the case in relation to ‘mad cow disease’.

Fig 10 depicts how healthy lamb, pork bacon and beef are perceived to be between 1989 and 1998. It is clear from this that the perception of how healthy beef was gradually declined from the end of 1989. Although there was a notable increase in this at the beginning of 1994, this decline continued and accelerated sharply throughout 1996. The profiles of lamb and pork mirror this in showing a gradual increase after 1996.

Source: JRA(1999b)

\*5 = very healthy, 1 = not at all healthy.
The Institute of Food Research provided data from the UK that was part of a European Union Project – RISKPERCOM (Sjöberg et al., 1998). There were three waves of data collection: March, April and May 1996. However, BSE was not one of the risks originally being assessed and was only added in for the April and May data collection. 

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7 There was a sample size of 704 over waves 2 and 3 in the UK.
Overall it was concluded that there were, ‘no or small effects due to wave’\textsuperscript{8}.

Fig 11 depicts the mean scores on each variable where the response options range from 1 very small risk to 7 very great risk\textsuperscript{9}. Emboldened variables indicate significant differences.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure11.png}
\caption{Mean scores on BSE risk}
\end{figure}

\textit{Source of data used in graph: Sjoberg (1998)}

So between April and May 1996 there was a trend towards a heightened perception of personal and general risk and in the amount of knowledge that the authorities were

\textsuperscript{8} The questions that were asked in relation to BSE are as follows:

1. How much do you believe that you are personally at risk from the following hazards or risks? \textit{The risk to me personally is}….
2. How much are people in your country in general at risk from the following hazards or risks. \textit{The risk to people in the UK in general is}….
3. How much can you protect yourself from the following hazards or risks. \textit{The possibility to protect myself is}….
4. How much do you trust the authorities in your country when it comes to their actions for protecting people with regard to the following hazards or risks. \textit{My trust in the authorities is}….
5. How much do you know about the following hazards? \textit{My knowledge about the hazard is}….
6. How much do you believe the authorities know about the following hazards? \textit{Authorities knowledge about the hazard is}….
7. How important do you feel that it is that the following risks should be reduced by your government. \textit{Importance of governments reducing the risk is}….

\textsuperscript{9} The response options on this question ranged from 0-8 and were: Non existent, very small, small, rather small, moderate, rather great, great, very great, don’t know. ‘Non-existent’ and ‘Don’t know’ responses were not included when compiling Fig 11.
perceived to have. There was not a significant increase in the amount of trust that people had in the authorities to protect them over the two months. This picture in relation to trust levels is supplemented by looking at the numbers of those that said there trust in the authorities was non-existent. In April 1996 20.3% of the sample said this. In the following month this reduced slightly to 17.6%.

Within this broad picture it is also instructive to look at the issue of uncertainty, that is, to look at the profile of responses for those people who said that they didn’t know what the degree of risk was.10

Looking at the changing percentages of those that selected the ‘don’t know option’, although none of the percentages are high, it is clear that there is a general trend away from the uncertainty (Figure 12).

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10 Elsewhere in the report we look at the effect of uncertainty where its source is either science or policy making. Here we are looking at the level of self acknowledged ignorance.
The Food Risk Questionnaire data set relating to food risk perceptions was collected both before and after the announcement in March 1996\(^1\) (Fife Schaw & Rowe, 1996).

Figure 14: Mean BSE ratings broken down by group/time of measurement for all samples combined

![Figure 14: Mean BSE ratings broken down by group/time of measurement for all samples combined](image)

Source of data: Fife Schaw (1996)

Figure 14 depicts the mean scores on each variable across each point in time.

\(^1\) The following questions were asked in relation to BSE:

1. How likely is it that your health will be harmed by the following things (1 – not likely, 5 – extremely likely)
2. How worried are you about potential risks associated with the following things? (1 – not worried at all, 5 – extremely worried)
3. How much do you think scientists know about any potential risks from eating or drinking the following things (1 – nothing at all, 5 – everything)
4. How easy is it to tell if a food you are about to eat…contains (1 – you can never tell; 5 – you can always tell)
5. To what extent is it your responsibility or the responsibility of the Government to protect you from harm to your health from the following things? (1 – totally my responsibility; 5 totally the responsibility of government)
6. How common are the following things in Britain? (1 – extremely rare; 5 extremely common)
7. How much control do people have over whether they eat and drink the following? (1 – no control; 5 total control)
8. To what extent are the risks to your health from the following things natural or the fault of mankind? (1 – natural risk; 5 man is entirely to blame)
9. How seriously do you think the following things may harm your health (1 – not at all seriously; 5 extremely seriously)
The three areas where there were significant differences across the waves are - man is to blame; people can control their exposure; decline in confidence that scientists understand the hazard.

The public becomes significantly more convinced that man is to blame for the hazard from BSE. This may well reflect media reminders that BSE is a hazard brought about by intervention in cattle feeding procedures (Fife Schaw et al., 1996, p.93). However, it is possible that latterly responses also related to perceptions of the way in which the crisis itself was handled, i.e." had it been taken more seriously earlier there would be less of a problem now".

Although still low, over the period there was an increase in public feelings that they can control their exposure to BSE. However, it is clear that this trend started before the 96 hazard notification.

There was also a significant decline in confidence between May 1995 and June 1996 that scientists understand the hazard.

On the question – ‘how worried are you about the potential risks associated with BSE’, up until March/April 1996 there is a evidence for a gradual increase in worry about BSE There is then a sharp decline in ratings of worry after March 96 to below May 95 levels. At the time this was assessed as suggesting that “the ‘scare’ has run its course, although in the absence of long- term follow-up and sales data this remains a moot point” (Fife Schaw et al., 1996, p.97).

To break this down further, a differentiation in worry levels appeared between people who do and don’t have children, with the former becoming progressively more worried. This differentiation again seems to have started before the 1996 hazard notification and, in contrast to the overall worry pattern, was maintained in June 1996. The effect of having children is also noted in the qualitative analysis of Reilly (1999c) who found that this was one of the most important incentives to stated changes in consumption patterns.

These public perceptions data would seem to be indicative of considerably more complexity than is evident within SARF. Evidence has been presented that different dimensions of perception are changing over the period in different ways. Some changes are gradual, on other parameters there is no change, for others the changes are differentiated in relation to different life situations. Some changes do seem to be linked to the March '96 announcement; others seem to emerge in later 1995, i.e. the feeling that people can control their exposure to BSE and also the divergence in worry between those who do and do not have children. This is given further weight
by the conclusions of a report for the Meat and Livestock Commission (MLC) which suggests there was a dramatic increase in awareness of BSE and of CJD as issues from late 1995\textsuperscript{12}. It can also be noted that SARF cannot explain the existence and the maintenance of the differentiation in worry between those that do and do not have children. However, this can be done by a model that allows for the effects of self interest.

Given that there is some evidence for increased concern it might be asked why the critical point in the BSE lifecycle did not appear earlier than March 96, for example, in relation to the high degree of failure to implement the Specified Bovine Offal Ban. In September and October 1995, 48 and 38\% of establishments respectively had failed to implement appropriate measures and failed spot checks (Lang, 1998). In answer to this it can be suggested that nothing that had happened at that time had been crystallized into linking BSE with a human health problem. Problems with cows were nothing new thus this information did not change the dominant representation of BSE.

**Impacts**

"BSE scares have affected household consumption of beef. Following the initial scare in 1990 beef sales in GB fell by 25 per cent. By the end of that year sales had recovered to their previous levels. Following the latest scare in 1996 consumption fell again, lower by 18 per cent for the year. Some recovery occurred in 1997 with a rise in consumption of 15 per cent"

Meat and Livestock Commission\textsuperscript{13}

Irish Food Board figures show that compared to the figures from before 20\textsuperscript{th} March 1996, consumption a month later was down 45\% in Germany, 40\% in France, and 30\% in Spain and Italy, (cited in Lang, 1998).

\textsuperscript{12} "What consumers think about meat: the long-term trends in consumer perceptions’. Prepared for the Meat and Livestock Commission by Millward Brown

\textsuperscript{13} http://www.bized.ac.uk/compfact/mlc
Fig 15 depicts the household food consumption of beef and veal, mutton and lamb, pork and poultry between 1974 and 1999.

This provides a useful reminder of the importance of considering the nature of long-term changes in meat-eating patterns. The market share of beef was changing well before BSE issues emerged. An important part of this is the rising profile of white meat that is considered to be healthier.

Figure 16 looks in more detail at the consumption patterns associated with different types of beef from 1995 to 1999. Clearly different types of meat were associated with varying impacts. Mince, with the highest levels of consumption, showed a sharp decline in 1996. Since that time however, consumption has gradually risen. The profile of other cuts does not mirror this.
Tracking Household food expenditure (Figure 17) clearly shows the differing trajectories of expenditure on beef and veal compared to poultry. 1996 witnessed a sharp cross-over in amount of expenditure.

Source: personal communication MAFF

Source: MAFF (2000)
Fig 18 looks at expenditure on beef in relation to different cuts of meat. Clearly, levels of expenditure were affected by the Mar 1996 announcement, although the apparent loss of consumer confidence varies across cut as do levels of recovery.

Fig 19 gives an indication of the degree of ‘penetration’ of beef, that is of the percentage of households that are buying beef. This graph is useful in that it makes clear the way in which seasonal variation affects beef purchasing patterns. It also makes clear the way in which there has been substantial recovery in this measure of demand for beef since 1996. It would also seem that the number of households purchasing beef in December has essentially remained the same before and after the 1996 hazard notification!
Economists have also explored the question of the potential long term impacts of the March 96 announcement. Caskie (1998a) suggests that

“It has become common place to say that the consequences of the BSE crisis reach far beyond the farm gate. However, quantifying the extent and significance of these secondary impacts is more problematic” (p. 1624)

He goes to suggest that the worst effects of BSE would be concentrated in a limited number of farm and ancillary sectors.

“It is apparent that the greatest damage would occur in those households which already suffer the severest economic disadvantage. Thus there are likely to be adverse inter-regional consequences”.

The likelihood of significant regional variation in other impacts such as the knock-on effect on employment is also drawn attention to by Tranter (1999d) and Bennett (1999e). This suggests the way that secondary impacts can be differentiated. If SARF is to be a useful tool for policy, it is vital that it incorporates an understanding of the processes that lead to, and can thus predict, such differentiation.

Other, at least potential, impacts have been noted in the literature. Harris (1997b) draws attention to

“The indirect costs on our relations with Europe for example or on long term social and political attitudes such as the consumption of processed food are more difficult to estimate but certainly significant and perhaps serious”

Bennett, (1999e) notes that English Nature - an agency responsible for advising the government on nature conservation matters –

“expressed its concern that the BSE crisis might result in detrimental impacts on the condition of semi-natural and grass wetlands, coastal grazing marshes and moorland Sites of Special Scientific Interest because beef farmers would increase their intensity of production”.

The BSE Inquiry can also be considered in relation to the impacts of risk amplification. It is outside the remit of this research to consider the Inquiry in any detail. The Inquiry was announced by Jack Cunningham, Minister of Agriculture, Fisheries and Food, and Frank Dobson, Secretary of State for Health on 22 December 1997. The terms of reference of the Inquiry are to establish and review the
history of the emergence and identification of BSE and nvCJD in the UK, and of the action taken in response to it up to 30 March 1996; to reach conclusions on the adequacy of the response, taking into account the state of knowledge at the time; and to report on the these matters to the Minister of Agriculture, Fisheries and Food, the Secretary of State for Health and the Secretaries of State for Scotland, Wales and Northern Ireland. The full BSE Inquiry report was presented to Ministers on 2 October 2000. Three aspects of the relationship between the inquiry and the impacts of social amplification of risk can be noted.

Firstly, within SARF, it is a classic example of a secondary impact of amplification processes for a regulatory agency.

Secondly, quite separately from the impact of the inquiry results, the contents of the report itself will provide an unprecedented opportunity to look at the way in which the actions (or lack of action) of MAFF resulted in risk amplification processes. Rarely is there such an opportunity to look at the way in which organisational changes have resulted from actions taken in relation to the hazard. A huge amount of data has documented these processes and the reasons that particular decisions were taken. As well as informing future risk communication strategies this is a process that that may shed light on the decision making processes of arguably the key station of amplification in relation to BSE /CJD. There are likely to be many lessons for other government agencies.

Thirdly, the BSE inquiry itself and its results is itself likely to act as a catalyst for further amplification processes. For example, delays in the process and suggestions of a cover up are likely to be grist to the mill of intensification and may act to further erode levels of general trust in the government. It suggests that governmental machinery for self adjudication is inappropriate and ineffectual. Any challenge to the viability of this process is likely to lead to further ripple effects.

INTERACTION OF LAYERS

Some observations can be made concerning the relationships between different layers of data.

It is common place, and to some extent was an initial stimulus for the development of the SARF, to note the lack of correspondence between the trajectory of the hazard event itself and the other parameters of SARF. It certainly holds in this instance in
that the magnitude or the timing of media coverage, expenditure on research, impacts on consumption and expenditure or measures of public perception cannot be explained with reference to the incidence of either BSE or nvCJD.

**Interactions with media coverage**

The peak of media coverage in 1996 does not find a clear echo in the variety of public perception measures that have been outlined. Although a existence of a close relationship between media coverage and public perceptions of risk is sometimes taken as constituting the litmus test of SARF, this over simplifies the contentions of the authors who fully acknowledge situations where there is no simple correspondence between heightened media activity and intensification of the risk (Kasperson, 1992). However, SARF does not help to explain this complexity. To do this, there must be an understanding of the processes that link media coverage and amplification of the risk.

Several points can be made about the relationship between the amount of media coverage and public perceptions. Firstly, some of the perception measures do show changes that would seem to be attributable to the peak of media activity subsequent to the March 96 hazard notification. For example, there was a sharp drop in the healthiness perception of beef and an increase in the concern expressed about BSE at that time.

Secondly, consideration of the possible relationships between media coverage and public perceptions accentuates the clear need of SARF to articulate the processes that mediate these. It would seem important to specify clear and testable hypotheses about the relationship between media coverage and public perceptions. As it stands at the moment, many different relationships could be taken as indicative of the importance of the media in amplification processes. For example, if patterns of public perceptions mirrored media coverage this could be considered as evidence for the role of the media in intensifying public perceptions of risk. However, a similar conclusion could be reached if public perceptions initially reflected increased media coverage but then continued to be heightened even when the volume of media coverage was reduced. The availability of data in this case study does not allow us to comment on the relationship between media coverage and public perceptions specifically in relation to the 96 hazard notification as there is no information available about the volume of national media coverage after this time. However, if the 1990 peak national media coverage is considered in relation to perceptions of the healthiness of beef (Figs 7 and 10) it is clear that when media coverage drops,
perceptions of beef do not revert to their former levels, indeed they continue to steadily decline until 1994, before more sharply declining again in 1996. However, the point here is that both this pattern and the alternative scenario of a re-emergence of heightened perceptions of beef being healthy could both be construed as giving support to SARF.

One very clear instance of where media coverage shows very little relationship with concern can be seen in Figs 8 and 9. Between 1989 and 1998 spontaneous mentions of concern about salmonella are considerably higher than those concerning BSE and at every data point except one are also higher than the numbers of people expressing concern about ‘mad cow disease’. In contrast to this, after the peak of coverage in 1989, media coverage of salmonella was almost non-existent. This complete lack of a relationship must be considered problematic for SARF and again is indicative of the importance of understanding the underlying processes. It may be that it is explicable in relation to the ‘layering in social amplification of risk processes’ (Kasperson, 1992, p.173). This refers to the possibility of amplification being differentially manifest at regional, national and local levels. However, to be useful the framework should be able to specify the conditions under which these phenomena are likely to occur.

It is clear from the Food Risk Questionnaire data that some public perception variables show heightened concern that was clearly triggered earlier than 1996. In other instances, the extent of de-intensification was mediated by other concerns: worry about BSE remained at a higher level for those who had children. If these patterns can be explained in part by media coverage, it is unlikely to be in relation to the volume of coverage alone. In this layering exercise there has been little consideration of media content. Clearly this is vital in understanding the content of representations of BSE (Reilly, 1999c).

As there is no available data concerning media coverage after 1996, the way this relates to levels of expenditure over this period cannot be formally assessed. However, it might be suggested that the sharp rise in expenditure has not been mirrored in increased media coverage. This raises questions about the relationship between these two parameters.
Interactions with impacts:

Five indicators of the impacts were used – Household Food Consumption in Britain 74-99; Household Expenditure in Britain 74-99; Comparison of beef consumption, Great Britain, 1995-1999; Comparison of beef expenditure, Great Britain, 1995-1999; and the percentage of GB households buying beef from 1994-1999.

A changed pattern of impacts that coincides with and can reasonably be attributed to the 96 hazard notification and the concomitant peak of media of media coverage with which this coincided can be seen on each of these graphs. However the profiles of impacts make it very clear that patterns of consumption and expenditure result from the action of a large number of long and short term economic, social, historical and political factors as well as to some extent reflecting media coverage.

These impact variables also indicate that there is some evidence of de-intensification since 1996 – more people are eating beef again and there is movement back towards 1995 levels. Clearly this prompts the question as to what underlies this erosion of the impact.

Apart from the complexity of the relationship between the media and public perceptions (the most proximate explanatory concepts within SARF), the task of answering this question is further complicated by the relationships between different impact variables themselves. These data also suggest that different impact variables seem to vary in how sensitive they are to, or at least, to how likely they are to reflect amplification processes. This is particularly clear in relation to the consumption and expenditure of different cuts of meat. It can be suggested that the maintenance of the impacts varied: profiles of recovery from the initial drop in consumption or expenditure vary. For example, consumption of mince (where consumption was previously highest) has risen every year since a steep drop in 1996. For roasting meat, where consumption is not as high, there was initial recovery towards the 1995 position. Since 1997 though consumption has dropped again and in 1999 was lower than in 1996. These complex interactions cannot be explained within SARF as it stands. They are likely to some extent to be affected by the sorts of image that different cuts of meat are associated with.

Economists have constructed models of likely long term effects of the crisis (Burton & Young, 1996; Burton & Young, 1997). They explore the question of the extent to which the changes in the demand for different meats has been due to standard economic influences (for example, changes in attitudes to red and white
meat, the relative prices of different meats and the demographics of the population),
and to what extent publicity about BSE has had an effect.

They look at *elasticities of demand*, which gauge consumers responses to price changes. This estimates, for example, the percentage change in demand for pork in response to a percentage change in the price of beef. The argument for doing this is that

“the greater the responsiveness in the demand for a product to changes in relative process, the more sensitive one might expect the demand for that product to be to changes in its other characteristics such as health risk”

In looking at the first peak of media attention in 1990, they estimate that it caused a 'transitory' loss of 5.4% in the market share of beef in the second quarter of 1990 with a 'sustained' loss of 4.8% by 1995.

The conclusions of Burton (1998b) partly echo those above, but (using different data and a different model) give a smaller estimate of the long run effects. They say that this seems to be due to “a declining marginal impact of media interest, which may be reasonable given the extreme variability of the sporadic media in the issue”. This is an interesting observation in relation to SARF. It suggests that different patterns of media coverage may be associated with different patterns of amplification. For example, it may be that long running low key coverage of an event lessens the likelihood of sharp intensification being associated with a subsequent intense period of media coverage. The exploration of such hypotheses may well have important implications for the regulator. For example it may be that it is in the regulators interest to maintain a consistent low profile in the media over an extended period of time.

**Interactions with expenditure**

As far as expenditure on BSE and CJD is concerned, it is commonplace to say that the BSE episode has cost the government millions of pounds. However, the figures provided in relation to the monies spent in relation to research into BSE and CJD provide an opportunity to consider their relationship with other constructs within the model.

As noted earlier, it is difficult to know exactly where within SARF government expenditure should be situated. However, the relationship between the other constructs of the framework and expenditure levels can still be examined. Initially it is clear that the timing and levels of spend bear little relationship to the incidence and
prevalence of BSE and CJD themselves. Certainly MAFF spending started in 1987 – the year that Ministers were first informed of the outbreak of BSE. Department of Health spending in relation to the CJDSU started in 1990 with other funding in 1993. The rise in confirmed cases of nvCJD is small and there has been a sharp decline in the number of new cases of BSE in cattle, however, expenditure has increased sharply over this time. This can be attributed to the many uncertainties surrounding CJ. It is unclear how many cases there are likely to be in the future, little is known about the possibility of person to person transmission and there is little information about preventative or therapeutic measures\textsuperscript{14}.

It has also been argued that both in relation to consumption, expenditure and public perceptions that there is some evidence of de-intensification. This is not matched in relation to expenditure where levels continue to rise. This makes explicit the question of the time lags that might be expected in interactions between different parts of the model. Clearly, it might be expected that some variables are more closely related in time than are others.

THEMES FROM THE DATA

Having used the layering method as fully as possible within these secondary data, three particular themes that the lifecycle of BSE raises can be briefly explored.

Uncertainty:

Considerable uncertainty exists in relation to many aspects of BSE. There was, and indeed is, scientific uncertainty concerning the nature of the infectious agent, the method of transmission, how the disease might cross species, how it might cross generations within species, and within what timescale the effects of BSE might be expected. Running alongside, and partly as a consequence of it, there is also evidence that there was considerable social uncertainty. How was this risk to be managed? What should the public be told and when?

The people and organisations responsible for making decisions in relation to the management of BSE were subject to both of these uncertainties. Initially however these uncertainties remained unacknowledged by decision makers. It was the consequent volte-face embodied in the 1996 hazard notification by the Secretary of

\textsuperscript{14} Personal communication from DH
State for Health that triggered a critical point in the lifecycle of the hazard. Reilly (1999c) presents data to suggest the role of uncertainty in risk amplification. The movement, on the part of a credible source, from apparent certainty to clear uncertainty led to expressions of the intention to institute behaviours indicating increased intensification (e.g. no longer buying or eating meat). It would thus seem critical to understand the role of uncertainty in amplification processes and the way that this should be managed in the process of risk communication.

However, there is nothing in SARF that allows specification of the way in which uncertainly affects risk amplification. This is a particular example of the way in which SARF does not allow us to distinguish between different types of hazard, that is it does not build into the framework the notion that hazards with different ‘personality profiles’ may be associated with particular processes of amplification. One implication of this is that SARF cannot facilitate the development of risk communication strategies that take the associated uncertainties into account. The BSE case study suggests that it is crucial to be able to do this.

Recent research has suggested that the public does have an understanding of the different types of uncertainty and that acknowledging the presence of uncertainty need not erode trust or belief in the expertise of the source. Categorical statements indicating that ‘we do not know’ or categorical assurances that a product is safe seem to have particular potential for risk intensification. It may be that communicating “this is what we are unsure about and this is what we are doing to find out” is the best approach. However, the lifecycle of BSE raises the possibility that the outcomes of doing this may vary in relation to the amount of associated controversy. That is, it may be that in highly controversial situations uncertainty should be handled in a different way than in less controversial situations. At the present time we know nothing about the interaction of controversy and uncertainty and the implications that this has for risk management. This is a major research topic for the future.

**Trust**

Within SARF one factor that is increasingly noted as being important in moderating amplification processes is trust. Later presentations of the framework note that trust can act to dilute or combat the pressure towards intensification created by other factors (Kasperson, 1992, p.174). Conversely, distrust of institutions and their managers is seen as one of the routes that can lead to ripple effects and secondary effects. The broader literature in this area (Cvetkovich & Löfstedt, 1999) notes the
relationship between failure in risk management and many of the qualities associated with a lack of trust: a lack of openness and transparency, failure to consult and be responsive. However, many unanswered questions remain within SARF concerning the ways in which trust is created, shaped, lost and rebuilt by individual and social stations of amplification.

This case study suggests that there may be an important distinction to be made between general and specific levels of trust. This suggestion is made on the basis of the fact that there would appear to be no evidence in the data or in the relevant literature that baseline levels of trust in the government have risen in any substantial fashion. However, there is evidence of de-intensification in relation to patterns of purchase and consumption; since 1996 these have substantially to their 1995 levels.

It is possible that such de-intensification can happen quite independently of trust. However it is also possible that in any particular context, although levels of generic trust remain low, sources can operate to change specific levels of distrust. They may occupy a low rung on a generic trust ladder and yet have considerable leeway in relation to the way in which their actions can generate trust in specific areas. In order to understand processes of amplification it would thus be important to understand what can be done in particular contexts to increase specific trust.

There are several factors that are likely to modify specific distrust. Firstly, distrust can be discounted if the individual anticipates personal advantage can result. The way in which information is interpreted can be moderated by self interest. In relation to BSE it could be argued that such self–interest was generated in relation to BSE by a reduction in the cost of beef and that this in turn changed purchasing patterns.

This argument is provisional and largely based on early reports linking a return to beef buying with supermarkets dropping prices\(^\text{15}\). However it would be further substantiated if data were available that related price fluctuations to consumption levels.

Specific levels of distrust can also be affected by the perceived level of support for the statement from other more trusted sources; the perceived motive of the source

\(^{15}\) Reuters news agency: April 1\(^{st}\) 1996: ‘Beef sales in Britain recovered over the weekend as consumers snapped up bargains after some stores slashed prices. The supermarket chain Sainsbury’s, which halved beef prices on Friday, said many of its stores had begun to order new supplies of beef because demand had been so heavy’.

Daily Telegraph, 24.11.1998: ‘The supermarket chain Asda said last night that it would not lift its foreign beef ban and had instead cut the price of British beef in store. Asda reassured British farmers that it would keep its British-only beef policy in place after three years. It also cut the price of sirloin by £3 a kilogram and rump steak by £2’
for statement - e.g. level of vested interest; as well as the actual structure and content of the statement itself - it depends what you say and how you say it, not just who you are. Each of these factors has the potential for the source to intervene to increase specific levels of trust.

It might be reasonably argued that increased patterns of consumption are not indicative of an increase in specific trust. It may be that they simply indicate a suspension of generic distrust. However, the outcome is the same: the effects that would otherwise be present as a consequence of distrust are nullified.

The suggestion here then is that impacts may be driven by a process that can operate quite independently of changes in risk perceptions. That is, it could be argued that increased consumption of beef is an function of the self interest generated by the assurances of safety in conjunction with a lowering of price. If the source merely said that beef was safe and did not lower prices, processes of self-interest would not kick in to produce behaviour that was consistent with, and yet unrelated to, generic trust. This possibility cannot be considered within the current formulation of SARF.

**Role of regulator in government**

The essentially unchallenged theme within the literature in this area is that MAFF could have handled the rise of BSE very differently and that risk intensification could have been avoided had different decisions been made. The argument is that patterns of behaviour, perception and the variety of impacts were driven to extremes by the ineptitude of the regulator.

“MAFF has entered the annals of food and public policy history as being the first ministry to help devastate an industry it is in existence to promote” (Lang, 1998)

Such an analysis fails to fully acknowledge is the way in which MAFF was operating in an economic and political context in which it was severely constrained.

One of the most important decisions that was made that set the context of subsequent decision making was the way in which BSE was originally defined as a animal health problem (Miller, 1999f). This determined that it was MAFF that was responsible for dealing with it and not an organisation dealing with human health issues. Had it been regarded from the outset as a public health issue, there would
have been different funding priorities and different policy decisions would have resulted. It has been argued that one of the reasons for not prioritising the human health issue was the perceived shortcomings of the way in which the Department of Health handled the salmonella affair in 1989 (Miller, 1999f).

MAFF clearly occupied a dual role insofar as issues of food safety were not disaggregated from their obligation to support the meat industry. There were inherent contradictions in MAFF’s food policy role in: promoting vs. regulating an industry. They were also operating within the context of the Conservative government that was committed to de-regulation and that had removed many of the state’s previously established regulatory procedures permitting changes in structure and the processes of meat rendering industries (Bartlett, 1999). Miller (1999f) also notes the increasing convergence between the chemical and food industries and the escalating industrialization of agriculture. This led to the use of pesticides and recycling of animal matter.

It could be argued that it was these constraints that constrained the decision making of MAFF formed the context for the spread of BSE through the British cattle herd, and to the rising incidence of nvCJD. Certainly it was against this background that MAFF were required to manage the risks of BSE and CJD. Consideration of these issues suggests that it would have been unthinkable in the late 1980’s that they should either raise the possibilities of human health implications or of the uncertainty that existed in relation the origins and transmission of BSE within cattle.

Clearly issues of power are central here in determining at a very early stage who was allowed to be a station of amplification. Such an analysis is crucial in exploring the ways in which information is or is not made available. Again it can be argued that an agency where there is no culture of open information provision cannot be expected to do this from a standing start.

Miller (1999f) whilst acknowledging the existence of many of the constraints noted above goes on to argue that,

“.. it is clear that different decisions in the regulation of and response to risks would alter the existence or even the scale of specific risks”.

It is therefore instructive to consider whether, bearing in mind all these constraints, at what points MAFF was able and should have acted to reduce the risk of transmission of BSE to humans and to minimise intensification processes. It is the task of the
Inquiry to deal with the first matter at least. However, as far as dealing with risk communication issues is concerned, two decisions that had crucial effects was firstly, to maintain silence thus creating an information vacuum and secondly to issue categorical assurances of safety. Although in 90-95 the media did fill this gap to some extent, the strong news values that exist within various media mean that a story where nothing is actually happening is unlikely to be pursued (Kitzinger et al., 1997). Focus group material (Reilly, 1999c) suggests that prior to 1996 there was a strong belief in the governments no risk message. It seemed that silence on the part of the government simply strengthened this belief and the new message of 1996 was particularly disturbing in this context. With the value of hindsight it might be suggested that some communication of the uncertainties that existed and the steps that were being taken to resolve them before this point would have met with less reaction than did the re-presentation of BSE by the Government in 1996. However, the communication of uncertainty in such a controversial situation may have led to rebuttal and argument that would lead to further risk intensification. Research to establish the likely effects on amplification processes of communicating uncertain information in situations that vary in their controversy would seem vital.

It can also be argued that the government further exacerbated matters by giving mixed messages, both in relation to the nature of the risk itself and also about its own credibility. Reilly (Reilly, 1999c) uses focus group material to show that a clear prompt for people to stop eating beef was the contradiction between the reassurances that beef was fine to eat and yet bowing to pressure from the EU to ban beef exports. The reaction to these mixed messages was further heightened by beliefs about the source of the message – that government was powerful and credible.

This analysis of the role of MAFF suggests that any consideration of ways of facilitating effective risk management strategies should be sure that

- The possible boundaries of hazards are defined appropriately
- Government agencies develop cultures that are able to be flexible, pro-active and speedily responsive.

EVALUATION OF SARF AND THE LAYERING METHOD:

Until now the life cycle of BSE has not been examined within SARF. The approach taken in this endeavour for the present research was to use the layering method with...
secondary data sources to evaluate the framework and to assess its usefulness for informing government risk communication initiatives.

The present analysis has focused on the hazard notification made by the British government in March 1996 concerning the link between BSE - a disease found in cows and a form of CJD – a disease found in humans. As far as possible data have been assembled to assess SARF in relation to this hypothesised critical point in the lifecycle of the hazard.

The evidence presented above suggests that the layering method has yielded a number of useful insights into the lifecycle of BSE. Whilst indicating some strengths of the framework it also suggests that in order to inform risk management and risk communication initiatives effectively, a focus upon the underlying processes is required to explain the considerable complexity within and between the layers of data.

Overall there is considerable evidence that the hazard notification of 1996 did constitute a critical point in the lifecycle of BSE. However, this analysis has shown that different public perception variables and different measures of impact showed different profiles of intensification; impacts also affect different groups/regions differentially.

Layering different types of data against each other was also instructive. It was clear that although many variables clearly reflected the March '96 hazard notification, there were no simple relationships between the volume of media coverage, levels of public concern, government expenditure and impacts upon consumption of, and expenditure on, beef.

The data were also indicative of some of the ways that changes in one part of SARF feed back into other parts. For example the literature suggested that one effect of the 96 hazard notification was that changed perceptions of the risk also resulted in changes in the ways that people viewed the media and the sources used, taking a more active role in seeking out information.

Similar complexities were noted in relation to government expenditure. Whilst it is vital to include such a variable in any assessment of the effects of a hazard event, it is clear that such a variable can be situated in more than one place within SARF. In part it constitutes part of the initial cycle of response to the hazard. It also clearly responds to the intensity of media coverage and intensified public perceptions.
Within SARF culture is simply specified as an over-arching variable. This case study is indicative of the way in which the broad historical and political context acts to facilitate or constrain the operation of other variables. Probably the clearest example of this concerns the constraints that political and organisational factors placed upon decision making activities on the part of the regulator during the BSE crisis. Another important contextual consideration concerns long term changes in meat eating patterns.

This case study raised the potential importance of the role of self interest in mediating risk amplification. SARF as it stands does not consider the operation of such processes. We would suggest that self interest plays a role in the reactance evident in relation to responses to BSE. That is, although people remain concerned, their behaviour in terms of patterns of consumption does not match this level of concern. It has been suggested that an important reason for this is in relation to the lowering of prices and the way that this benefits self interest. This process may also be at work in relation to the maintenance of worry about the risks of BSE shown by those that have children. A third arena where self interest may be important concerns the way in which concern about beef is apparently not generalised to other meats or foods. The Food Risk Questionnaire shows no evidence of a widespread impact of the announcement on perceptions of other potential food hazards – if anything they become less dreaded. Similarly consumption of other meat is not affected and meat eating levels are largely maintained through swopping on to other meats. Self interest may be being served here too. Identifying reasons for the maintenance or erosion of impacts has been identified as a research priority in relation to SARF (Pidgeon, 1999). The evidence presented in relation to BSE suggests that self interest may be a key explanatory variable here.

IMPLICATIONS FOR GOVERNMENT

1. The BSE case study has shown the layering method has the potential to constitute a useful diagnostic and evaluative tool. Although it has been limited in relation to the available secondary data, a number of insights into the process of risk amplification have emerged. It has helped to delineate many of the complex relationships between variables and confirmed the value of focusing on the processes that link that layers of data. Further
consideration should be given to collecting data that is compatible with the requirements of the layering method.

2. In line with the requirements of the layering method there is clearly a case for setting up a systematic monitoring system of public perceptions of food risks which would allow tracking over long periods of time. This would allow for an assessment of the impact of specific events and of mass communication campaigns. Thought should be given to developing key measures of public behaviour, concern, media interest. Clearly government already do monitor impacts that are indicators of changes in public policy and legislation. Many economic indices are also already compiled as a matter of course.

3. This case study has indicated the importance of how particular questions are asked, the terms that are used, and has suggested that the meaning of questions may change over time in relation to the operation of amplification processes themselves. Other research has shown that ratings of one particular hazard in part depend on the other hazards for which judgements are required. We were not in a position to take account of this in the present research; rather it was assumed that any context effects would equally affect different waves of data. If such data are to be collected systematically over time, methods would need to be in place to allow for such context effects.

4. A major future research topic should be to clarify the nature of the relationship between uncertainty and controversy. This relates to the way in which people interpret risk communications as well as the way in which the media report situations that vary along those parameters.

5. In the light of the low levels of generic trust that are accorded to many government agencies, it is vital to explore how specific trust can be created or at least how generic distrust can be suspended in particular situations. It is suggested from this case study that the role of self interest is likely to be key here.
6. In the light of the experiences of the regulatory agency in relation to BSE, the importance of creating a climate of flexibility, a willingness to be proactive and speedily responsive is paramount. It is equally important for such agencies to be aware of organisational and political/economic affordances that could constrain/facilitate decision making and thus affect risk amplification.

7. Pro-activity and speed of response are vital in delivering information, particularly in situations of uncertainty.

8. Consideration should be given to the possibility of using data generated by the BSE Inquiry to explore the relationship between the regulatory agency and risk amplification processes

Reference List


Miller, D. (1999f). Risk, science and policy: definitional issues, information management, the media and BSE. *Social Science & Medicine, 49*, 1239-1255.


### Figure 1: BSE: Secondary Data for Layering Method

<table>
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<tr>
<th>EVENTS</th>
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AMPLIFICATION OF RISK AND THE 1995 ‘PILL SCARE’

INTRODUCTION

As part of an evaluation of the Social Amplification of Risk Framework (SARF) the notion of hazard sequences has been developed. The purpose of this case study is to introduce data relevant to the ‘pill scare’ of 1995 and to situate these events in relation to the notion of hazard sequences. The possible implications for risk communication in relation to Hormone Replacement Therapy (HRT) as well as for SARF are suggested. An outline of SARF is contained in Annex 1.

KEY POINTS FROM THE CASE STUDY

• SARF does not consider the ways in which a series of related or re-iterated hazard notifications effects the amplification of risk.
• This scenario is a common one for government agencies.
• The notion of hazard sequences has been developed to deal with this.
• Within a hazard sequence there is often a critical hazard notification.
• Hazard sequences can help explain why de-intensification occurs after a critical hazard notification.
• Amplification processes are also related to the application of media templates.

KEY LESSONS FOR GOVERNMENT

When managing risks and designing risk communications it is vital for government agencies to

• Consider the position of a hazard notification within a hazard sequence.
• Anticipate de-intensification
• Understand the content of the media template being used within a hazard sequence
• Plan hazard notifications in full acknowledgement of the template being used by the media.
• Use appropriate research methodologies to monitor hazard sequences.
OUTLINE OF REPORT

The structure of this paper is thus as follows. Firstly, the necessity for an explicit consideration of the effects of a series of related or reiterated hazard notifications will be suggested and the notion of hazard sequences will be introduced. Secondly, the data relevant to the ‘95 pill scare will be described. Finally, the potential benefits of a more substantial consideration of the role of hazard sequences will be suggested initially in relation to hazard notifications in relation to HRT and then for SARF and risk communication efforts more generally.

HAZARD SEQUENCES

As a starting point in evaluating the applicability of SARF and in exploring ways in which the predictive power of the SARF might be increased, the observation can be made that the notification of a hazard is rarely an isolated event. In relation to any hazard there are often several hazard notifications that occur sequentially.

There may be an identifiable hazard event that is the subject of a series of hazard notifications. Similarly there may be events that are that are technically or structurally related that can be identified as occurring at different points in time and that are each the subject of one or more hazard notifications. The effects of such ‘hazard sequences’ is currently not considered in relation to SARF and yet our research suggests that they direct amplification processes, specifically in relation to how risks become normalised. It is especially vital for regulatory agencies that issue a series of hazard notifications to understand the ways in which this can impact amplification processes.

We would characterise a hazard sequence as having the following elements

• A series of hazard notifications, which may (but need not) be technically related; they would be ‘structurally similar’.
• Occurring in specifiable temporal sequence
• Each open to amplification processes

Data relating to the various hazard notifications that there have been in relation to the risks of the oral contraceptive (OC) pill will be described and used to suggest that in order to understand the impact of a particular hazard notification and the consequent amplification processes, it is important to locate it in relation to previous hazard notifications.
THE PILL SCARE IN 1995

Data

The material in this case study has been gathered from press releases, press cuttings, articles in the Lancet and the British Medical Journal, other journal articles, reports from the British Pregnancy Advisory Service and interviews with Doctors involved in research on the pill sponsored by drug companies and Post Licensing Division of the Medicines Control Agency. Schering UK provided time series data relating to women's perceptions of the OC pill.

Introduction

Oral contraceptives have a history of being linked with negative health outcomes (Potts, 1991).

There had been other pill scares in the 70's and 80's which had been linked with impacts on both the birth rate and the number of abortions carried out.

“For some mysterious reason these periodic crises have been a particular feature of Britain; during the 1980's for example false alarms about major effects on breast cancer risk created greater consternation in Britain than elsewhere”

For example, in 1983 it was observed that,

“The response of women to publicity following adverse reports of oral contraceptives has been followed by a now familiar pattern in the last 15 years or so. Troughs in pill usage trends tend to coincide fairly consistently with emerging epidemiological evidence demonstrating possible morbid side effects” (Wellings, 1985, p.95)

It was suggested at that time that after each scare numbers of pill users gradually climbed to pre pill scare level, but that overall there is a 'cumulative effect of adverse publicity on pill discontinuation rates' (Wellings, 1985, p.96). Since 1995 there have been several further hazard notifications linking the pill with either breast cancer or thrombosis. None of these precipitated the magnitude of impacts associated with the Department of Health notification in 1995; they have generally met with disinterest on the part of the public and the media. Arguably the 1995 notification was the most significant hazard notification in the hazard sequence.

1 BMJ 1999, 318, 69-70
2 See too Jones(1980)
Background to the 1995 announcement

The 1995 ‘pill scare’ is generally considered to have been triggered by a statement by the Committee on Safety of Medicines (CSM) in October 1995. However, it should be noted that in the months preceding this, there was much negative publicity for low dose contraceptive pills in relation to the potential association with thrombosis and pulmonary embolism. This centred around three main areas. Firstly, individual case studies about women that had problems with the Pill were highlighted in the media. One of which concerned the death of a 16 year old woman on the Pill. Secondly, in April and May of 1995 there was considerable publicity in both the local and national press in relation to solicitors advertising for women who had problems on the Pill to come forward and their subsequent marshalling of a multi party action against Schering Health Care Ltd (SHCL). This was in relation to one particular brand of pill: Femodene. At the time it was suggested in the medical press that this story alone had led some women to stop taking the Pill. Thirdly, in July, there was a World in Action programme dealing with thrombotic risk and the Pill. SHCL, the manufacturers of Femodene the brand that was under fire, informed GP’s of the impending programme as, ‘it could result in your patients contacting you with concerns’. They also arranged for additional telephones to be manned at SHCL ‘in case there is a large response from the public and the medical profession’. Schering also prepared a Briefing Document in July 1995 that traced the development of concerns over Femodene since 1988. This document noted the imminent publication of epidemiological studies relevant to this issue. Also at the time the Family Planning Association and the Birth Control Trust issued statements to set the relatively rare potential costs of the Pill against the more common benefits.

It is clear from this evidence that over the course of 1995 these events provided a context in which there was considerable sensitivity about the potential risks of the low dose contraceptive Pill.

3 Letter from Managing Director of Schering HCL to all employees
However, the pivotal point in what is generally known as the 1995 ‘pill scare’ was an announcement by the Dept of Health in Oct 1995.

October 1995

Late in the afternoon of Wed 18th Oct 1995, 190 000 letters were sent out to GP’s giving advice about the possible increased risks associated with third generation oral contraceptives4. The Medicines Control Agency, the mailing organisation and The Post Office were apparently each to some degree responsible for the fact that many GP’s did not receive their letters until the Friday or even after the weekend. One reason that the letters were sent so late in the day was that the relevant European body, the Committee for Propriety Medicinal Products (CPMP) was asked to discuss the matter early in the day and the risk communication exercise was put on hold in anticipation of their response. The letters finally sent when it was clear that an immediate CPMP position was not going to be reached.

By 0900 the next day the press were seeking further details. It is said that the press received this information through a journalist whose partner was a GP who did receive the ‘official’ letter. The information was given out at a press conference as an emergency announcement at the end of a routine briefing on an unrelated subject. It was on the national news at 1300 that day and women started to contact their GP’s; in many cases before their GP’s knew anything about it.

The letter to GP’s gave advice in relation to the results of three, at that time unpublished, studies submitted to the Medicines Control Agency (MCA) and a subcommittee of the Committee on Safety of Medicines (CSM). The letter stated that the research provided reassurance in relation to the two ‘second generation pills’ but that oral contraceptives containing desogestrel and gestodene were

   “associated with around a twofold increase in the risk of thromboembolism, compared with those containing other progestogens”.

No indication was given of the absolute level of risk associated with the third generation pills. The advice was that these pills should only be used by women who are intolerant of other combined oral contraceptives and who were prepared to accept an increased risk of thromboembolism. All women were advised to complete

4 Committee on Safety of Medicines communication to doctors and pharmacists: Combined oral contraceptives and thromboembolism, 18 October 1985
their current cycle and informed that no changes in prescribing practice was required for any other combined oral contraceptive.

On the 19th October by a Department of Health press release from the Chairman of the CSM, Professor Michael Rawlins reiterated the advice of the CSM statement and included several additional statements, e.g.

“We realise that our advice will place a burden on doctors and pharmacists and hope that they will recognise that it was important for us to issue advice on this matter as soon as possible”.

Despite the reassurance of safety, such statements may well have increased the alarm at the risks of the pills (Furedi, 1999). On the same day, Professor Spitzer, an author of one of the reports that the CSM’s conclusions were based on, flew into London, convened a press conference disagreeing with the conclusions that the CSM had drawn from his data, arguing that they had acted prematurely and misinterpreted his study.

A further Department of Health press release was issued on the 20th October to respond to suggestions made by Professor Spitzer and justifying the course of action taken as being in the interests of public health 5. Professor Rawlins addressed the criticism that the action taken was premature and incorrect. He said,

“In no way was our action premature. There is now clear evidence of an increased risk of thrombosis with these pills and it is right that women using them and doctors prescribing them should have been made aware of this as soon as possible”

Also on 20th October the drug companies that produce the named pill brands also sent letters to GP’s and pharmacists suggesting that the CSM had acted prematurely on the basis of what they termed a ‘preliminary evaluation of the data’ (SHCL) that was ‘inconsistent with more than ten years of clinical trial data’ (Wyeth Laboratories).

Media coverage

There was a huge amount of coverage in the press as well as in specialised medical journals (Weatherall, 1996). This contained three main themes.

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Debate about the accuracy and reliability of the scientific evidence

This debate went on in the medical press at the time and indeed is still an issue today. At the time, Spitzer (who had led the Transnational study; one of the 3 studies that the CSM decision was based on) stated that

“I believe the associations shown do not justify haste in decision making….my colleagues and I are uncertain whether the modest increases in the odds ratio for venous thromboembolism (VTE) can best be explained by bias or as causally significant”.

Other explanations for the association between the ‘third generation pills’ and VTE were offered. For example, women may have been recruited who had developed the disease of interest. Also, as the evidence suggests that most thromboembolic events occur within a few months, it was suggested that the risk could be overestimated if short-term use was over-represented in the database.

For others the focus was on the fact that the studies were unpublished and had not yet been fully subject to peer review. It was suggested that the CSM had acted as judge and jury on unpublished data.

These points were subsequently addressed by those associated with the decision to inform women of the increased risks. Rawlins (4/11/95 BMJ) said that none of the studies referred to preliminary findings. None of the authors had retracted their publications. The possibilities that findings could be explained by bias, chance or confounding had been considered and rejected.

When the studies finally were published it was said in an editorial in BMJ that

“the published evidence confirms the Committee on Safety of Medicines concerns”…. Now that the data are published it seems clear that the CSM did what it had to do.

After the 1995 scare the MCA asked the CSM to include relevant data and advice about the risks in the product information included in oral contraceptives. The CSM’s position was firstly that there was a difference in the risks of a VTE associated with particular types of oral contraceptive, and secondly that these products should not be used as a first line product when prescribing an OC. The various affected drug

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6 Data from transnational study of oral contraceptives have been misused, Walter Spitzer, BMJ, 1995; 311, 1162, 28th October
8 Third generation oral contraception and venous thromboembolism, K.McPherson, BMJ, 1996; 312:613
companies appealed against this. The Medicines Commission (MC) then gave their verdict which recommended that a warning was included in the product information of the affected OC’s although the advice differed in some measure from the recommendations of the CSM. There were two regulatory changes that could have been made. Firstly, to include a general warning in the product information e.g. that some studies have shown that … therefore to take into account. Secondly, to change the contra-indications of the product. The MC ruled that only the first option should be taken. It was the second option that would have most affected the drugs companies in terms of lessening the numbers of people that doctors would be willing or likely to prescribe the drug to. This judgement thus enabled both sides to claim a partial victory. However, it was generally reported in the media that there had been a U-turn on the part of the MCA. A senior figure at the MCA said that this was because “the companies are good at using the press and we’re not”.

The judgement of the Medicines Commission was reported by Jeremy Metters the UK deputy chief medical officer in April 1999. He said that

“the government gave the advice that it thought was right at the time, based on the data available. Since then the data has been extensively worked over”.

Criticism of the content of the CSM communication

This was probably the area that attracted the majority of criticism from the medical fraternity. There were many criticisms of the things that were said as well as suggestions of what should have been said.

The main criticism here concerned the fact that the figures in the CSM statement were made in relation to relative risk, i.e. that these brands were associated with a doubling of the risk of suffering a VTE. It did not say that in real terms this meant that compared to other oral contraceptives, the risk would increase from 15 women out of 100 000 women per year to 30 women. Similarly the risk of subsequently dying from a episode of VTE (i.e. 2 in 100) was also not included in the risk communication.

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9 Interview with senior figure from Medicines Control Agency, 04.05.1999
10 Guardian April 8th 1999
“Relative risks are not absolute risks. The average GP will see one case of Pill related VTE in his or her working life time”

This focus on relative risks of different pill types was seen to play into the hands of the media in that

“all news editors were agog last year to learn that the new contraceptive pills had ‘doubled’ the chance of a blood clot... Hence the splash headlines and extensive radio and television reports…. Not many would have been interested in a story that said the number of women at risk from the new pills had risen from 1.5 to 3 per 10 000”

The perspective of the Medicines Control Agency emphasised the difficulties of defining the level of absolute risk on the basis of the studies causing concern. These new data were rather seen to focus on the relative risks and the CSM risk communication in turn reflected this.

It was suggested that there was little indication of potential costs being set in the context of more generally agreed benefits; the way this risk was communicated was seen to have the effect of overshadowing the potential safety attributes of the third generation pills. It was not made clear that other risks may increase on other OC’s and would certainly be higher during pregnancy. Similarly, these ‘third generation’ oral contraceptives had been developed and promoted in relation to their reduced effect on lipid and carbohydrate metabolism and thus a decreased likelihood of increasing arterial disease. These potential benefits did not form part of the context for highlighting the risks.

Reviews of this episode suggested that even if the advice on medical grounds was good, that there were more appropriate ways of presenting the information. For example, that women should discuss a possible change in prescription at the next routine appointment.

**Criticism of the timing of the CSM communication**

“the unpublished data from the transnational study of oral contraceptives have been misused and misinterpreted in Britain because of inexplicable haste and urgency not thought necessary by other major regulatory agencies.”

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11 Dr M.Walling, *Doctor*, 23.6.1988
13 Dillner BMJ, April 96
14 Data from transnational study of oral contraceptives have been misused, Walter Spitzer, *BMJ*, 1995; 311, 1162, 28th October
The result of the timing of releasing information meant that many women went to the
doctors knowing more about what the CSM had announced than did the doctors
themselves.

From the perspective of the MCA the timing of the communication was not
inexplicable. The perspective of a senior physician within the MCA at the time
explains the reasons for the timing of the decision as follows,

“The MCA had been aware of the growing accumulation of data that was
indicated the increased risks associated with third generation OC’s for
several months prior to the risk communication of the October. There were
three studies suggesting these risks. There was thus a danger of these
results being leaked and this possibility was considered as potentially
damaging. The dilemma for the MCA was thus seen between being pro-
active in managing the risks or of running a risk of the information being
leaked. The issues were presented to the Minister who agreed that in the
light of a possible leak that the MCA should not sit on this evidence, setting a
challenging timetable within which the information would be released.

We were in damage limitation mode. The background was one of bad news.
There had been the World in Action programme which had associated the Pill
with possible problems - on the basis of poor evidence. At the time the MCA
were aware of strong evidence to suggest that there were problems. What
ever we did it wasn’t going to be good”

Impact of 1995 announcement

“Two years after the 1995 warnings by health authorities there have been no
epidemics of deep vein thrombosis or pulmonary embolism. But epidemics of
anxiety and therapeutic abortions have occurred in several countries.”

“It seems that the 1995 pill panic has had a significant, if unintended negative
impact on public health” (Furedi, 1999)

15 Interview with senior figure from Medicines Control Agency 04.05.1999
16 Spitzer
These can be considered in 3 different areas.

**Impacts on pill users**

An impressionistic picture of initial consumer reaction can be gleaned from the letters pages of medical journals\(^{17}\). Doctors were inundated with the ‘worried well’; many women – contrary to the advice given by the CSM – did not finish taking their current course of pills. Mini-surveys carried out within particular practices generally noted the way in which the communication had worried women, that they had contacted doctors/help lines and in some cases stopped taking the pill. For example a postal survey in Oxford found that of 172 women, 20 had stopped taking pill immediately\(^{18}\). Telephone help lines recorded massive increases in questions from both users and health professionals (Furedi & Furedi, 1996)

Surveys commissioned by Schering Health Care found that in 1993 24% of the women questioned said they would never consider the pill as a method of contraception. By 1996 this had risen to 33%\(^{19}\).

Looking longer term, there were direct impacts of the event on patterns of pill use

- **Use of pill/prescriptions:** third generation pills had 55% of market in 1994, 15% in 1998\(^{20}\).
- **There was a 10-15% drop in the use of the pill in general between 1994 and 1998\(^{21}\).**

There were also indirect unprovable impacts of the ‘pill scare’ on pregnancy and abortion rates

- **Increase in conceptions generally and teenage pregnancies in particular** (Furedi, 1999)
- **Increase in abortions** – “The total number of abortions notified in England and Wales in 1996 was 8% higher than in 1995 and reversed the progressive decrease in the annual numbers that began in 1991” (Furedi, 1999).

ONS stats in 1999 drew attention to the maintenance of this trend.

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\(^{17}\) BMJ, 16.12.1995
\(^{18}\) Hope, S. letter to BMJ, 1996, 312:576
\(^{19}\) SHCL, information briefing for the media, Consumer contraception NOP survey’, 19 Sept, 1996; cited in Furedi (1999).
\(^{20}\) Personal communication, Prof Ross Lawrenson, European Institute of Health and Medical Sciences, University of Surrey
\(^{21}\) stet
“I think that there is a general feeling that the Pill scare caused a crisis of confidence among women in methods of contraception and that will not go away”  

Furedi (1999) also draws attention to the effect of the increase in unintended pregnancies on the health of women and their families.

**Impact on health service relationships to patients.**

Clearly one of the most immediate impact upon GP’s was the increased calls upon their time that resulted from women seeking reassurance and guidance as to an appropriate course of action. Walling (1996a) suggests that more than half of all pill users sought urgent medical advice and that average consultation times doubled. The literature also suggests that this episode raised the spectre of the heightened possibilities of litigation stemming from adverse health effects that could be linked with OC prescriptions. Such concerns lead to defensive prescribing practices (Furedi, 1999). Trust in GPs is likely to be heightened by belief in their competence. It is likely that where GP’s did not know first hand what the CSM were recommending that this would have affected women’s perceptions of their competence. This may in turn, at least temporarily, have affected the extent to which women trusted in their doctor and the advice they were given and may lead to resisting reassurance in relation to other health concerns.

Furedi (1999) also notes the impact of the unanticipated increase in births and abortions upon service providers in terms of increased expenditure on maternity and abortion services

**Effect on the progress of research:**

This was a common theme in medical journals. The affected pills were marketed in part on the basis of their reduced effect, compared with other progestogens, on lipid and carbohydrate metabolism. Thus it was suggested that what was perceived as a “hurried rush to judgement” may have seriously damaged the chances of knowing what the potential benefits of these pills were.  

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22 Karen Dunnell, Editor of ONS bulletins, *Times*, 17.2.99
Impact on risk communication policy of MCA/CSM

A senior figure at the MCA said that the messages in the CSM document ‘could have been clearer’ and that lessons had been learned from what had been an ‘extraordinarily unpleasant experience’. The MCA would now aim to:

- have a wider involvement of experts of different types.
- increase the focus on absolute risk
- provide information for patients as well as doctors
- to use more effective modes of speedy communication
- not send out such information close to a weekend
- co-ordinate such risk communications with the availability of the published evidence where possible

In the Chief Medical Officers Annual Report for 1995 there seems to be an implicit acknowledgement that mistakes were made in relation to risk communication and a new procedure is outlined for classifying risks.\(^{24}\)

International repercussions

A qualitative investigation spanning 42 countries (Furedi et al., 1996) concluded that

> “the effects of the October pill panic were truly global and that the UK action seriously undermined the actions of other national medicines control agencies who had chosen to interpret the new studies more cautiously”

OTHER OC HAZARD NOTIFICATIONS

Following events in 1995 there have been other hazard notifications in relation to the OC pill

1996: OC pill and breast cancer:

In June 1996 the CSM wrote a ‘Dear Doctor’ letter to GP’s informing them of an imminent leak relating to the potential link between OC’s and breast cancer.\(^ {25}\) This


\(^{25}\) From the Chairman of the CSM Oral Contraceptives and Breast Cancer CEM/CMO/96/7. 15th June 1996
referred to a meta analysis by Professor Valerie Beral\textsuperscript{26}. They said that no change in prescribing practise was indicated, that patients should be reassured that there was no reason to stop taking the pill, and that the balance of risks and benefits for OC’s was favourable. Information that could be given to patients was attached.

This story was leaked, prior to its scheduled publication in a journal, in the Sunday Times on Sunday June 16\textsuperscript{th} under the headline, “Pill users face 10 year tumour risk”, the next day the headline was, “Pill in new scare over breast cancer”. In the Telegraph this was reported as “Birth pill carries breast cancer risk for 10 years”. The tone of the coverage was condemned in the Lancet. It was dubbed as sensationalist and the goal that fully peer reviewed research should be available was reiterated.

Secondary reporting was limited. There was no evidence of increased public anxiety.

1997: OC pill and strokes

In Dec 1997 the BMJ had published in relation to the link between ischaemic stroke and oral contraceptives,\textsuperscript{27} finding that the women were 2.9 times more likely to have a stroke if they were taking the latter. Although on the surface this might seem worrying the authors qualified it saying the ‘attributable risk’ was very small because the incidence of strokes of women of reproductive age is very low. The conclusion was that the benefits of OC’s far outweighed the risks.

There was evidence of some sensationalised reporting by the media (5/12/99, Mirror headline was ‘Pill raises risk of stroke four times.’) Attempts to provide more balanced information (e.g. small absolute risk, benefits of OC’s) were generally reserved for the following small print.

There was no evidence of mass public anxiety following this.


In January 1999 the results of a 25 year study were published\textsuperscript{28}: 10 years after giving up the pill women were at no greater risk of developing cancer than those who had never taken it. This followed 46000 women for 25 years. Dr Clifford Kay who began

\textsuperscript{26} BMJ, 1996 347:9017.  
\textsuperscript{27} BMJ, 1997; 315:1502-4  
\textsuperscript{28} BMJ, 1999; 318:96-100
the study in 1968 stated that the study would help alleviate fears about the side
effects of the pill. The results were reported by the national press. (Guardian: ‘25 year study gives the
Pill a clean bill of health’; Independent: ‘Pill gets all-clear in 25-year study’)
Then in April it was widely reported in the Press that “Scientists in new row about the
safety of the pill”
Many of the papers reported the views of Klim McPherson writing in the Journal of
Epidemiology and Community Health saying that the conclusions of the 25 year
study were flawed because they used few of the women at the greatest risk from
breast cancer and that breast cancer can remain latent for 20 years. It was
suggested that recent reassurances may be seriously misplaced. The assertions
were rejected by the research team in question.
In July 1999 the BMJ contained a rejoinder from McPherson saying that his
editorial was designed to reduce undue complacency about the safety of the pill and
that “less illegitimate certainty is needed”.
Although it was suggested that Professor McPherson’s comments “caused alarm
among family planning specialists who fear another pill panic”, there was no
prolonged coverage of the issue by the media nor any evidence of public anxiety.
2000: OC pill and thrombosis
In June 2000 it was reported in the newspapers and TV on basis of a study in the
Lancet that women taking OC’s were 10 times more likely to develop blood clots in
lungs with third generation pills carrying the highest risks. Expert quotes suggested
that absolute risks were not infinitesimally small
Quotes from government spokesperson stressed that the risk was low, less than in
pregnancy, and whilst the results did need to be evaluated that there was no basis
for concern.
Again, there was no suggestion of increased public concern and media coverage
was very limited.
THE OC PILL: A HAZARD SEQUENCE

In summary, the series of hazard notifications relating to the OC pill constitute a hazard sequence. We would argue that within this hazard sequence, the announcement by the Department of Health in 1995 constitutes a critical hazard notification. This represented a turning point in the way in which OC health hazards were represented – that is, it was the critical hazard notification that shifted the representation of the pill from possible hazard to full hazard status; from medically safe to medically risky though possibly necessary. Clearly, there are important substantive differences between this and the hazard notifications in the sequence. Notably, the 1995 message contained novel information in that it was the first time different levels of risk had been associated with different brands of OC. In addition, no recommendations for changing prescribing practice were associated with later hazard notifications. There were also differences in the predicted fatalities, in the novelty and human interest values of the stories and in the relationship each notification had with other concomitant news stories. However we would argue that considering these notifications as a hazard sequence allows consideration of the processes that may underlie the lack of public reaction and the fewer and more minimal impacts (i.e de-intensification) evident after a critical hazard notification.

We would suggest that these can be considered in three main areas.

PROCESSES UNDERLYING DE-INTENSIFICATION

Pill users

The reaction of pill users to later hazard notifications is constrained to some degree to their reaction to earlier scares.

Those that are most reactive have stopped using the pill at the time of the critical hazard notification and so are not available to react in relation to later hazard notifications. Of those that continue to use the pill some of them will have decided on the costs and benefits of being a pill user at the point of the critical hazard notification. Later hazard notifications will also be responded to on the basis of this. In this way, all the public reaction that would be visible has been seen. This is supported by the evidence suggesting that prior to the pill alert many women did not know that the pill may increase the risk of venous thrombosis (Allison, Roizen, & Olivier, 1997). For these women this information was gained and decisions made in relation to it in 1995. Subsequent notifications would thus be assimilated into this very different context.
There is some support for this notion both in relation to the data relating to the user group that were arguably most affected by the '95 hazard notification and from the literature.

It is arguable that teenage girls were most affected by the 95 scare. It was here that there was the most notable rise in the number of unwanted pregnancies occurred (Furedi, 1999). It might be argued that for this age group there was little awareness of the potential risks associated with the Pill; they would have been very unlikely to be sexually active at the time of the previous hazard notification in relation to OC’s. Thus, they were the group that had the maximum potential for a visible reaction.

Secondly, the way in which one hazard notification forms the context for a later one is referred to in relation to the Tylenol drug scare. Here the reaction to a second incident was much more muted than the first. An analysis of the impacts associated with the life cycle of the hazard suggested that

“…. much of the adjustment in the probability of drug tampering had already taken place and consequently little stock market effect should be expected “

(Dowdell, Govindaraj, & Jain, 1992)

There are two further factors that help explain the changed patterns of reaction of users that are evident across a hazard sequence. Firstly, pill users will be subject to peer group normalisation; that is, they will receive information from their peer group that increasingly normalises the association between the pill and health risks. Secondly, they will be the target of an increasing amount of post scare medical reassurance. Arguably in relation to the OC pill, the content of such communication also became more appropriate.

**Media treatment changes**

Any explanation of the effect of a hazard sequence on reactions to any particular hazard notification must also take account of the role of the media. Within SARF the media are a key station of amplification, although the processes that govern both the way in which the media make decisions about how to report risks and the way in which media information is assimilated and used by various publics has been largely unspecified thus far.
Hazard templates

It is clear from the work done in this project in relation to decision making in the media that ‘templates’ are constructed for different risk events. These templates would include information about the hazard, have a range of arguments, scenarios and counter arguments concerning causes, accountability, what the event signals and so on. Particular individuals and organisations would be situated within the template and would be illustrative of particular viewpoints. The template would be used to direct reporting of the hazard.

Several implications of media templates can be suggested.

The media as a learning organisation

Decision makers within the media accumulate, filter and verify information either to form a new template of the hazard or to assess it and adjust it against a previous one. New information is incorporated or considered as extraneous to the template. So in this way, a later hazard notification does not find the same audience as an earlier one. Each hazard in a sequence is greeted by a changed media.

The role of media templates in relation to critical points

In relation to the pill we would argue that a template for reporting OC hazards was constructed in relation to the 95 pill scare. Although there had been other pill scares, it might be argued that this did constitute a novel risk insofar as there had never been a hazard notification that associated different levels of risk with different types of OC. The potential link between OC’s and thrombosis was also relatively novel in that the most recent negative associations for the pill was with breast cancer and cancer of the cervix in 1993 (Wellings, 1985) and breast cancer in 1987 (Bromham, 1996).

Re-application of templates

The same media template was used in relation to subsequent hazard notifications regarding OC risks. The same template was applied because it seemed applicable, that is, later pill hazard notifications did not add anything to the template built around the 95 hazard notification; there was no new information that rendered the template obsolete; it was not stretched or challenged in any substantive way.

Thus for both the media and for users, after a critical hazard notification, subsequent hazard notifications may simply confirm it; they do not require further adjustment of belief or action. It can be noted that media reporting of the later hazard notifications often referred back to the 1995 ‘pill scare’, that is, later reporting of OC risks was
anchored in relation to the critical hazard notification. Another reporting strategy that is in line with this notion of new information being assimilated to the original template is illustrated in relation to the headline “Pill sales slump after scare\(^{35}\). Much of the article that followed was concerned with litigation issues in relation contraceptives that were not implicated in the 1995 ‘pill scare’.

**Sensationalism and social responsibility**

A further issue that can be noted in relation to media coverage of the OC hazard sequence concerns the tension between sensationalism and social responsibility. It is clear that the media have often been held responsible for women being pessimistic about the side effects of OC’s (Potts, 1991) and that media reporting is seen as the main reason for the variation in pill discontinuation rates (Jones, Beniger, & Westoff, 1980). Certainly they were often blamed by the medical establishment for sensationalising the risks of OC use in the 1995 ‘pill scare’. Three things can be said about this.

1. **Media criticism can be unwarranted.**

   The newspapers were criticised for not publishing the absolute risk figures when these were not contained in the original CSM communication. Similarly, they were criticised for focusing on the relative risk figures when this was the emphasis of the OC risk announcement.

2. **Sensationalising and risk intensification**

   It is unclear what the relationship is between sensationalising and risk intensification: where sensational headlines appeared there was not necessarily any evidence of increased public anxiety. The present arguments about hazard sequences would suggest that the relationship between public perceptions and the media may vary in relation to the stage of the hazard sequence.

3. **Social responsibility in risk reporting.**

   Contrary to what is commonly perceived, there was some evidence of a desire for social responsibility on the part of the media in relation to the reporting of the OC hazard sequence. The media interviews conducted with senior editors as part of this research suggests that in some instances sensationalism is considered a response to a perceived lack of prompt and accurate information.

\(^{35}\) *Daily Telegraph*, June 24th 1996
The indications of more socially responsible reporting was also remarked on, if slightly obliquely, by the Medicines Control Agency

“The pill was damaged in 1995 and since then even the media have been loathe to cover the pill issues in a negative way. The media were aware that to some extent that the ‘pill scare’ had been over hyped and thus were unwilling to trigger further publicity in this area”

It was suggested by the MCA that this reticence was indicated by the way in which the media ‘missed some snippets’ in the results of the Royal College of General Practitioners study (see above ‘1999: OC Pill and breast cancer’) that might have suggested that the results were not as reassuring as they appeared.

In summary, it has been suggested that hazard sequences are associated with particular patterns of amplification and that this can help explain the responses to and impacts of the hazard notifications that followed the 1995 ‘pill scare’. However, as noted above, it is not being suggested that there were no intrinsic differences between the different hazard notifications. Clearly there were. Hammond (1996b) suggests that the reason for the different reactions between the 1995 and 1996 hazard notifications essentially lies in the differing reactions of the regulatory authorities. We would argue that the evidence suggests that the differing patterns of amplification associated with the two stories are not simply a function of the intrinsic qualities of the stories nor of the differences in the way that each story reached the media and developed as news. They are also a function of the position of each notification within the hazard sequence.

**HRT, THROMBOSIS AND BREAST CANCER**

Having introduced the notion of hazard sequences in relation to oral contraceptives, can these concepts be applied in relation to Hormone Replacement Therapy (HRT). What are the implications for risk communication of doing this?

The 12th October 1996 saw the publication of three papers in the Lancet showing an increased association of deep vein thrombosis and/or pulmonary embolism in women currently taking HRT. On the basis of this, in November 1996 the CSM announced that “it would be prudent to review the need to review the HRT treatment
in women who have … predisposing factors. Discussion between experts as to the possible association of HRT and VTE continued into 1997.

Following this, in October 1997 the Medicines Control Agency received a draft of a paper due to be published in the Lancet on 18th Oct. relating to a link between HRT and breast cancer. The details of this were leaked and published in the Sunday Times on October 5 under the headline “HRT link to breast cancer proved”.

“HRT, the ‘youth drug’ taken by millions of women, has been indisputably linked to breast cancer in the world’s biggest study of its long term risks”.

The newspaper report gave no figures relating to absolute risk but rather said that for some groups of women, the relative risk of developing breast cancer is 2.3 times higher for HRT users than for non users. This figure was incorrect – it should have said that the risk was 1.023 greater.

On October 9th a statement from the Committee on Safety of Medicines stated that, “overall these new results do not alter the balance of benefits and risks for HRT and that they do not provide a reason for women to stop their treatment.”

The increase in absolute risk was given and it was stated that the HRT/breast cancer link was not new. The findings were not seen as markedly altering the balance of risks and benefits for HRT or as providing a reason for women to stop their treatment. Patients were directed to further information.

On October 11th the study was reported in the Lancet having been brought forward from the previously arranged date of the 18th. The editorial also commented on the issues that the leaked information had raised suggesting that the result of this was “worse than we could have conceivably imagined….The Sunday times has a huge circulation….The damage to women’s confidence in HRT is likely to be severe.”

36 Risk of venous thromboembolism with hormone replacement therapy. Committee on Safety of Medicines, November 1996
37 BMJ, 1997; 314:376
38 BMJ, 1997; 314:1415
39 This incident involved the same journalist, researchers and funding agency as in the pill/breast cancer link in 1996
40 Epinet message from Chairman of Committee on Safety of Medicines 09/10/97
41 Lancet, 350, 9084
42 Lancet, 350, 9084 Editorial
The editorial discussed the issue of the leak and the internal divisions that reportedly characterised the funding body of the research the International Cancer Research Fund. Further commentary the following month suggested that the HRT overview

"needs cautious interpretation if widespread panic is to be avoided with ladies stopping HRT all over the place"^43

However, no public reaction to these hazard notifications was reported

HRT as a hazard sequence

On the basis of these hazard notifications this constitutes a HRT hazard sequence. However, as yet it does not appear that there has been a critical hazard notification relating to HRT. However, before exploring this in a little more detail it is important to consider the links that may exist between the hazard sequences of the OC pill and HRT.

Clearly there are important differences between the two types of medication which could mean that it may be inappropriate to link the hazard sequence of HRT with the hazard sequence of the OC pill. Perhaps the most important difference is the fact that temporary stopping of HRT because of a ‘scare’ has few health consequences, whereas temporary stopping of the pill (even one dose) may lead to pregnancy. Secondly, the purposes of the two medications are different^44: The long term benefits of HRT prolong well-being in ageing, whereas the pill enables recreational sex by preventing pregnancy. Thirdly, their consumer publics are different (young vs. older women). These groups also have a different relationship to the media. Finally, the processes underlying HRT use are likely to vary in relation to two distinct user groups, that is women that have and have not had a hysterectomy.

However, it is important to consider the possibility that at the present time HRT and the OC pill may be part of the same process of normalisation.

There is some evidence to suggest that representations of HRT are strongly related to that of the pill and that previous OC use can constitute a barrier to the uptake of HRT (Griffiths, 1995; Quine & Rubin, 1997; Kuh, Hardy, & Wadsworth, 2000; Newport, 2000). The exact nature of this apparent overlap in representation remains an empirical question. However, there is some evidence to suggest that they are

^43 Lancet, 350, 9091 quoting letter from ICRF’s director of clinical research
^44 Hormones, women and safety BMJ 1997; 315:493-494
both part of a template relating to medical products that affect hormone levels, impact upon a woman’s cycle and that are intermittently linked with negative impacts. It may also be that the commonalities that exist are a function of the cohort of women currently using HRT being part of the cohort of women that were one of the first generations of OC pill users.

The nature of the relationship between HRT and the OC pill is clearly important in relation to future possible public responses and impacts in relation to HRT. To the extent that the representation of HRT is consistent with and assimilated to that of the pill it can be suggested that the critical hazard notification for the pill in 1995 may have

- affected the representation of HRT
- affected the uptake of HRT
- directed the nature of the hazard sequence for HRT

These issues are crucial to all those that are concerned with communicating about HRT. If the HRT hazard sequence is part of one relating to women’s hormonal products in general and the OC pill in particular and is thus shaped by the critical hazard notification in 1995, this has major implications for those concerned with the various interest groups aligned around HRT. For example, those bodies concerned with promoting the use of HRT need to consider the possibility that uptake of HRT at least for the current generation of eligible women will be limited as a function of links with contraceptive pill dangers. It may therefore be useful for them to consider ways of shifting the representation of HRT away from that of the OC pill.

Another consequence of the HRT and OC pill ‘sharing’ a representation may be that HRT is to some extent shielded from an independent critical hazard notification. This in turn has consequences for the likely impact of any risk communication concerning HRT.

Another possibility is that the hazard sequence relating to HRT is unrelated to that of the OC pill. This would lead to a different set of predictions – all other things being equal, there would be a increased possibility that a hazard notification would become a critical hazard notification in the lifecycle of the product. Media interest in this is currently low. This is likely to be particularly so in the light of the victim group characteristics. However, the point being made here is that it also likely to be low to the extent that the template which the media use for reporting HRT is related to the template that is used for the risks of OC’s.
PRACTICAL IMPLICATIONS OF HAZARD SEQUENCES FOR SARF AND RISK COMMUNICATION

It is crucial for the regulator to understand how hazard sequences operate and within this, how hazard representations are interrelated. The success of risk communication initiatives are in part a function of hazard sequences and also of the relationship between different hazard sequences.

Specifically, those involved in risk management should

- Assess whether particular hazards are part of a hazard sequence
- Anticipate de-intensification i.e. normalisation even for maximum impact risks
- Anticipate the speed of the media response as a hazard sequence progresses – i.e. they have a template prepared that they are ready to apply
- Identify the media template being used.
- In making or responding to a hazard notification – respond quickly and in full acknowledgement of the template
- Learn to anticipate the content of particular hazard templates.
- Anticipate that people do not respond to small and subtle differences between the hazards in a sequence – what may be important facts/changes to scientists are less likely to be so to the various publics that receive them. Therefore, do not over estimate the detail required in risk communication messages. Comprehension is more likely to be achieved by using links to broad social representations and templates.
- Particular research methodologies are needed in order to learn more about hazard sequences. Not all research designs are can monitor and be sensitive to changes in hazard sequences. There is value in studies that describe the history of a hazard. The layering method which utilises different levels of analysis at different points in time is likely to be particularly effective in tracking the dynamics of hazard sequences.
The potential value of the concept of hazard sequences is clear in looking at the specific questions that it raises for risk managers. It raises new possibilities for prediction and effective intervention.

CONCLUSION

Although the CSM announcement of October 1995 was widely criticised, this analysis has shifted the focus and used the events surrounding the ‘pill scare’ to introduce and illustrate the notion of hazard sequences. Incorporating this concept within SARF has the potential to refine our understandings of risk amplification processes. It is also a valuable risk management tool enabling preparedness for designing, delivering and responding to hazard notifications.
Reference List


ANNEX SIX

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AMPLIFICATION OF RISK: THE SITING AND DEVELOPMENT OF AN NGL FACILITY

INTRODUCTION

This case study concerns the life cycle of a Shell Natural Gas Liquids Facility in Fife - one of the largest such facilities in Europe. It is used to evaluate the usefulness of the Social Amplification of Risk Framework (SARF) for understanding risk impacts and for directing risk communication initiatives. An outline of SARF is contained in Annex 1.

The Fife NGL plant was designated as a CIMAH (Control of Industrial Major Accident Hazards) site, that is, it is a 'Seveso Directive site' with potential for off-site impacts in the event of a major accident. It was deemed to constitute an acceptable risk from a regulatory perspective but the site fell within the relevant regulatory regime. CIMAH regulations did not require operators to publish their detailed safety cases; however, COMAH, the regime that has replaced CIMAH does impose that requirement. This case study may thus be particularly instructive in identifying the most effective risk communication processes and techniques in avoiding intensification when COMAH safety reports are to be placed in the public arena.

KEY POINTS FROM THE CASE STUDY

- Processes of risk amplification vary widely between ‘publics’, even within a similar geographical area.
- Characterising particular patterns of behaviours/perceptions as intensification or attenuation can be problematic.
- Vital to consider the role of self interest in risk amplification
- A range of social influence strategies to effect amplification are used by pressure groups
- The perceived actions (or lack of) of the regulator can be used by other parties to validate their own arguments or actions
- The process of risk communication takes place in the context of hazard negotiations
- Critical points shift the way in which the risk is represented. Various factors can act as ‘critical point triggers’
KEY LESSONS FOR GOVERNMENT

When managing risks and designing risk communications it is vital for government agencies to

- Use research that would characterise the diversity of public reactions. This would avoid undue weight being accorded to pressure groups when designing risk communication strategies
- Consider the role of benefits in increasing risk tolerance
- Explore ways in which perceptions of their independence can be fostered
- Be aware of the way in which hazard negotiations can redirect and focus processes of amplification
- Understand the importance of critical points in the lifecycle of the risk (including creating, avoiding or dissipating them)

OUTLINE OF REPORT

This report is structured in the following way. Firstly, the activity of two periods of time for which we have obtained detailed information about the life cycle of the Fife NGL plant will be sketched. Secondly, the importance of understanding processes of amplification is explored in relation to six areas: publics not public, amplification and economic benefits, pressure group composition and strategies, the way in which the regulator can be used to warrant particular courses of action, hazard negotiations and critical points.

THE FIFE NGL FACILITY

This case study is based on material drawn from a range of mainly secondary sources. These include interviews with plant staff and pressure group activists, information leaflets and environmental statements by Shell; Shell internal documentation; letters of complaint from public and pressure group members; responses to letters of complaint; press releases; presentation of Societal Risk Analysis; reports and data from qualitative and quantitative research carried out in 1993 and 1996; reports of risk consultancy used by Shell and their recommendations about developing a community communications strategy.

There are two parts to the Fife NGL facility – the Mossmorran Processing Facility and the Braefoot Bay export terminal. Mossmorran is a permanently manned installation located in Southern Fife between Cowdenbeath and Burntisland. It
occupies a 250 acre site in association with Exxon Chemical Olefines Inc. and Shell Gas. Braefoot Bay is located on the North coast of the Firth of Forth between Aberdour and Dalgety Bay. The Shell jetty extends 190 metres from the shoreline into a stretch of water known as Mortimers Deep. Natural Gas Liquids are pumped to Mossmorran in an underground pipeline from the Brent Oil field via St Fergus.

The NGL’s require fractionation at Mossmorran before they can be used in the production of a range of products. They are stored there in refrigerated storage tanks before the propane and butane are transported 7 kms to the export terminal at Braefoot Bay through underground pipelines, where tankers are used to ship them to customers.

There are two particular periods where the life of the plant has been documented. Firstly around the time at which planning permission was granted (1977 – 1979) and secondly around the time of the proposed expansion of the fourth module/3rd jetty from 1994-1996. Material from both of these time periods will be used to address and illustrate a number of issues that are instructive in relation to understanding processes of risk amplification. The timescale of these events is detailed in Appendix 2.

1977 – 1979

Initial interest in locating an NGL facility in Fife was expressed by Shell and Esso in 1976. The Mossmorran –Braefoot Bay application was only one of three requests for planning permission – there were two others connected to the same site although neither of these came with a firm commitment to take up the application if granted although they potentially provided many more jobs. Planning permission was obtained when the official decision of approval was announced in August 1979. This application for planning permission met with significant local opposition from the Aberdour and Dalgety Bay Joint Action Group (‘the Action Group’). This was mainly articulated at the local public inquiry.

“The key points of controversy at the public inquiry were whether the potential economic benefits to the region would be sufficiently large to offset the potential negative impact of the facility on the environment and, more importantly, the possible risk of a catastrophic accident” (Kunreuther & Linnerooth, 1983b)
Unusually, the decision resulting from the inquiry was delayed whilst the Secretary of State for Scotland considered new evidence that was raised by the Action Group concerning the possible dangers of ignition of a vapour cloud from sparks generated by a local transmission mast. However, planning permission was finally granted when it was stated that

“the plants can be designed to operate within an acceptable level of hazard”

Although the Action Group lodged an appeal against this decision at the Court of Appeal in Edinburgh, this was unsuccessful.

There were several key parties in this decision process. They are identified by MacGill, (Macgill, 1982; Macgill, 1983a; Macgill, 1983b) as being the oil companies, the local authorities, the Department of Energy/Industry, the Scottish Development Department, the Health and Safety Executive, the Forth Ports Authority and the Action Group. Each of these groups situated themselves in relation to at least one of the following issues: national benefits, local socio-economic aspects, health and safety and the environment. The context for understanding the processes of social amplification can be most usefully set in relation to noting the position of the main players on these dimensions, that is, the oil companies, national and local government, the Health and Safety Executive and the Action Group, as well as the way in which these positions were countered by other parties when appropriate.

1. National benefits: It was clearly stated by the Scottish Secretary that it was in the national interest for developments such as Mossmorran – Braefoot Bay to go ahead. The main financial benefits would accrue from export earnings. Prestige was a further significant benefit. The objectives of the oil companies coincided with the national interest. However, for the Action Group this was the dimension of least concern and the nature of the national benefits was not strongly contested by them.

2. Socio-economic benefits at a local level: This is dealt with in more detail below, however, it can be noted that the local authorities in particular envisaged the development as having a significant expansionary effect on the local economy. The NGL plant was not the only development that planning permission was being sought for and, in fact, it was only if all three proposals came to fruition that the employment benefits to the community would be really significant. It was only the Action Group that consistently expressed doubts about the likelihood of this occurring, suggesting

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1 Letter giving Secretary of State's decision of approval 9/8/79
that the local authorities were being too gullible in believing the assurances of the oil companies.

3. Health and safety. It was in this area that the majority of the debate took place. The potential hazard at the Fife plant resulted from the bulk handling of liquefied energy gases. Because the plant was located close to residential areas there was extensive discussion of the risks of loss of containment of gas and the possible sources of ignition that might lead to fire or explosion. The oil and gas companies seeking planning permission assured all parties that the plant would not pose any unacceptable risk. In order to assess the magnitude of these risks, the local authorities appointed their own consultants rather than rely upon the Health and Safety Executive (HSE). In the resulting Cremer and Warner report (1977) hazard potentials were expressed non-quantitatively. The view of the HSE itself was that in principle Mossmorran and Braefoot Bay were both good sites and that no intolerable situation would be imposed on the community if the plants were designed, constructed, installed, operated and maintained to the highest standards (Macgill, 1982, p.125). The only group opposed to the development of the facilities was the Action Group and this opposition was mainly articulated on grounds of health and safety (see below).

4. The environment: The losses here mainly affected the Braefoot Bay site and consisted of noise, visual and marine pollution, interference with tourism and agricultural and heritage losses. Although the companies stressed their record of good environmental management, they admitted that the developments would change the form of Braefoot Bay as it then was. Although planning conditions aimed to minimise environmental impact, the local authorities admitted there would be a ‘small but unavoidable’ amenity loss at Braefoot Bay. Again, the opposition in this area came from the Action Group who, in the early stages, focused upon the way in which siting the plant would damage the environment.

1994 -1996

After the plant was commissioned, the next period of activity within the lifecycle of the hazard for which secondary data is available relates to the proposed expansion of a 4th processing module at Mossmorran and, more contentiously, the addition of a 3rd jetty at Braefoot Bay. This application met with a massive and vociferous public opposition. Key personnel from the disbanded Action Group were active again.
There were two particular events that formed the background to this opposition. In
the ‘Havkong incident’ in January 1993, the liquid petroleum gas tanker ‘Havkong’
broke loose from her moorings at the Shell Expro jetty at Braefoot Bay Terminal. No
serious injuries or damage resulted, however, the incident was jointly investigated by
the HSE and the Marine Accident Investigation Branch. Clearly this incident affected
the way in which the risks of the plant were represented. It was considered to
embody many of the fears that people had expressed in the initial siting discussions
and it certainly figured in many of the concerns that were expressed about the
planned expansion of the Braefoot Bay terminal.

A focus on air quality and specifically on Benzene which allegedly has connections
with carcinogens and leukaemia arose in 1994. Atmospheric monitoring revealed
high peaks of Benzene levels and these results were released before it was realised
that the results were incorrect, allegedly due to the contamination of measuring
equipment. Although technically it was not needed in that emissions were within
acceptably safe levels, a vapour recovery unit was installed. This was partly in
recognition of the concerns of the local community. The potential impacts of air
quality upon respiratory health was also a theme in letters of complaint about the
proposed expansion of the plant.

When planning permission for the 3rd jetty and 4th module was applied for, Fife
Council, on the advice of HSE, requested that Shell carry out a Societal Risk
Assessment of Braefoot Bay operations to analyse the probability of large numbers
of fatalities. Later that year Shell withdrew the application, on the basis that the
anticipated increase in gas production output from the North Sea was lower than
expected due in part to reduced demand and in part to the gas supply being
processed elsewhere. In order to limit speculation that the withdrawal was anything
to do with the SRA, and to reassure the public about safety, Shell “voluntarily
decided to complete the SRA and provide the local community with the results”
(Kemp & Wilkinson, 1997). The SRA, underwritten by Shell’s independent safety
consultants, Arthur D. Little, had concluded that

“..the levels of risk from shipping operations to the local community were very
low and well within limits used by the Health and Safety Executive”.

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2 Press release from Shell
Shell’s nervousness, following the Brent Spar controversy, was related to the fact that detailed calculations of the low probability but high consequence events shown by the SRA had the potential to intensify existing local anxieties. An external consultancy was therefore appointed by Shell in order to develop a strategy for dialogue with the community both in relation to the SRA and in devising a more long-term communications strategy. The indications at the time were that the approach adopted was a successful step in beginning to build better relationships between Shell and the local communities (Kemp et al., 1997). Recent evidence suggests that these improvements have been maintained.

EXPLORING AMPLIFICATION PROCESSES

As is often likely to be the case when using secondary data sources, in this case study it has not been possible to use the full layering method as outlined in Annex 1. A particular focus of this case study has rather been the relationship between the risk management activity of Shell and responses of various publics, and particularly those of the Action Group. This is set against the broader backdrop of local and national government actions. In line with the layering method this data has been assembled across time where possible.

It was suggested in the outline of SARF (Annex 1) that one particular shortcoming is the lack of attention paid to the processes that link the various constructs of the framework. This is addressed in this case study in a number of areas. Firstly, the importance of considering different publics, their responses to risks and the various motivations that underlie these are considered. Secondly, some definitional issues within the framework are addressed in relation to a consideration of how economic benefits of the plant siting affects amplification processes. Thirdly, the range of pressure group activity in relation to both the siting and development of the plant are outlined. This explores the effects of the group composition and looks at the strategies used to endeavour to effect change. The strategies of another pressure group – acting on behalf of Shell – are also noted here. It is suggested that one particular strategy adopted by both of these groups was to use the position and activities of the HSE to warrant particular courses of action. This issue is explored in some detail. Finally, the case study data are aligned in relation to two particular concepts that extend and develop SARF: hazard negotiations and critical points.
Publics not public
The material from this case study is instructive when considering local and national layers of amplification. Kasperson (1992) draws attention to the way in which amplification processes can be layered such that there may be attenuation at the local level and intensification at the national level. This case study goes further and suggests the importance of recognising greater differentiation at a local level, the parameters along which this differentiation might be manifest, and the characteristics of the communities that may be associated with it.

The secondary data clearly indicate that risk amplification processes were differentiated in relation to different geographical areas. The residents of Cowdenbeath reacted to the siting and expansion of the plant quite differently from the residents of Aberdour and Dalgety Bay. Broadly, the residents of Cowdenbeath were much more favourable to the siting and development of Mossmorran than the residents of Aberdour and Dalgety Bay were in respect of Braefoot Bay. Although the main core of protest was located in the Action Group, the conclusion of researchers working in the area at the time was that there was widespread opposition in Aberdour and Dalgety Bay to the position taken by the local councils and support for the Action Group (MacGill, 1982). In contrast to this, the population of Cowdenbeath (the town adjacent to Mossmorran) was strongly in favour of the proposed developments although this support was benign. This support undoubtedly linked with their beliefs about the likely increase in job opportunities that would accrue from this (see next section). Unlike the communities of Aberdour and Dalgety Bay, the residents of Cowdenbeath did not organise themselves into any sort of pressure group. MacGill (1982) suggests that some felt themselves to be adequately represented by the local authority councils, however the main reason for their support of the development was because of the associated economic benefits. Although they could be said to have had as much incentive to form themselves into a pro group as those living adjacent to Braefoot Bay had to form themselves into an anti group, the pro group does not form while the anti group does (Thompson, 1983a).

Having seen the way in which these local communities viewed the risk very differently, some of the community characteristics that may have some explanatory power in relation to the different patterns of amplification can be noted.

Aberdour and Dalgety Bay are essentially middle class villages, the boundaries of which extend to within one mile of the Braefoot Bay jetty site. Around the time of the
plant siting each had an estimated population of 4000, although the population of Dalgety Bay has since grown to about 10000. The two communities were clearly differentiated from Cowdenbeath with respect to employment statistics and socio-economic status. Cowdenbeath was a town with a high unemployment rate with a much lower socio-economic composition than the towns of Aberdour and Dalgety Bay. Aberdour was primarily a retirement area. (Macgill, 1982)

It can also be suggested that there are different publics in terms of their exposure to the media. In the Fife area there were two sister papers covering the area – the Fife Advertiser covering the Cowdenbeath area and the Dunfermline Press in the coastal area covering Aberdour and Dalgety Bay. The Editor of the Fife Advertiser, who was also editor when planning permission was being sought for the site over 20 years ago, confirmed that these ‘sister’ papers did report different perspectives on the story. This was done simply to reflect the socio-economic, historical and geographical background and thus the differences in the interests of the readership. Thus the activities of the action group were less extensively reported in Cowdenbeath where there was a greater emphasis on the economic benefits expected to accrue from the plant. This thus raises the question of the importance of such differential cyclical reinforcement of pressure group activity.

Although thus far the communities of Aberdour and Dalgety Bay have been referred to together and contrasted with Cowdenbeath, it is much too simplistic to suggest that Aberdour and Dalgety Bay were entirely similar in their attitudes to the siting or to its subsequent development. They too constituted different publics.

The survey data allows for comparison of the views of different communities on a variety of issues relating to perceptions of risk, concerns, and beliefs about the trustworthiness of management. Certainly the data are clear in suggesting the importance of considering the notion of publics rather than an undifferentiated public. There is also evidence of changes occurring in the period between 1993 and 1996 where the direction of the change varies across communities.

Although all groups are fairly happy with their area, this is especially true of the residents of Aberdour (see Fig 1).
As far as concerns about Mossmorran are concerned, the profiles of concerns across 1993 (Fig. 2) and 1996 (Fig 3) are not dissimilar: the risks from explosions and pollution remain the greatest concerns. Within this though there are different profiles across geographical areas, notably Dalgety Bay evidences a much greater concern about pollution in 1996. Interestingly though, this pattern is not evident in relation to spontaneous mentions of pollution in relation to Mossmorran (Fig 4).
Fig 3: Greatest issue regarding Mossmorran – 1996

Fig 4: Unprompted mentions of pollution concerns in relation to Mossmorran

Dalgety Bay is also more negative in relation to believing that companies run the plant in a safe manner, this being in contrast to residents of both Aberdour and Cowdenbeath. The reasons for the differences between these various publics are likely to be complex. However, the point here is to note the different attitudes and beliefs in communities that geographically are aligned to the hazard in similar ways.

Thus far it has been suggested that it is likely to be a useful exercise to develop our understanding of how amplification processes might vary in relation to different publics. Following on from this it can be suggested that it can be problematic to
characterise these publics as exemplifying particular processes of amplification. In relation to the siting and development of Mossmorran and Braefoot Bay, SARF simply allows us to consider the possibility of a heightening or constraint in responses (i.e. intensification or attenuation). Working within these parameters for now, it might be suggested that the evidence is broadly in line with responses in Aberdour and Dalgety Bay being intensified, that is, that public perceptions of the risk and the behavioural responses that this engendered were much greater than warranted by expert opinion. Certainly, by comparison with this the reactions of Cowdenbeath residents were attenuated as were the impacts (e.g. people failing to take action against the company). However, if it was only the reactions of the Cowdenbeath community that were being considered, it would be hard to substantiate the argument that their reactions were in line with the risk being attenuated. Rather, it might be argued that for the Cowdenbeath residents the dominant amplification process was one of representation of the risks, that is, a representation was constructed that broadly coincided with expert opinion. Certainly, the financial benefits that might accrue to local residents were actively promoted as part of the ‘risk representation’ by Shell and the local authorities and this would seem to underlie the acceptance of the site by Cowdenbeath residents and the apparent lack of willingness to complain.

Taking on board the notion of segmented publics has a number of implications. It would seem important to carry out research to understand the extent to which, and the circumstances under which, variations in amplification processes are linked with parameters such as socio-economic status, geographical location, employment situation and media exposure. In doing such research it is important not simply to define publics on the basis of the differential evidence for amplification processes – rather different publics should be identified and then variation in amplification processes explored.

Cremer and Warner, the risk assessors appointed by the local authorities to assess the risks of siting the Fife plant, suggested in their report that,

“The criteria of acceptability of risk must be set by the community at risk and not handed down to them as technical statements.” (Cremer & Warner, 1977)

At the time, the notion of moving away from a simple reliance on the sufficiency of technical risk assessments was clearly a radical one. However, in the light of the variety of publics that might exist in relation to any particular issue, such a recommendation is likely to prove too simplistic in practice. Different sections of the
community have different answers to the question of what the relevant parameters are and how important they are. When publics are segmented in this way it is likely that there will be some groups that will benefit from the developments and some that will not. This has implications for the development of successful risk communication and participation initiatives on the part of government and industry.

In summary, there is significant diversity in public reactions to risk. Little research to date has attempted to characterise this diversity thus it is not possible to systematically describe types of public reaction. One benefit of such an endeavour would be to locate the views of pressure groups within a wide spectrum of opinion thus avoiding giving undue weight to a minor but salient segment of the public when designing risk communication strategies.

**Amplification and economic benefits**

One issue that arises in the case study concerns the nature of the relationship between amplification processes and economic gain. This highlights the importance of considering the role of self interest in risk toleration. As noted above, the potential economic benefits to be derived from siting the plant formed an important part of the oil companies' assurances to the local authorities and to the local population. Although some jobs would go to existing Shell employees, the companies undertook to employ and, if necessary, to train local people. The construction phase was expected to generate up to 3,350 jobs on the site and the operational phase about 100 jobs. However, it was clear that any major long-term positive socio-economic impact would result from the possibility of downstream plastics industries materialising. It was suggested that there would be 1600 permanent jobs if this happened. It was clear from the outset that, other things being equal, the local authority would support any application to bring a major industrial development to the area in the light of the severe unemployment problems in and around Cowdenbeath given the decline in the coal industry. In April 1977, unemployment rates were running at 19.3% compared with 7.8% for Scotland as a whole (MacGill, 1982).

So, at first sight at least, it would seem that the greater appreciation of potential economic benefits was associated with a lower level of concern about the negative effects of the plant. Before exploring this in more detail, a brief glance at the perspective of SARF on this issue is likely to prove instructive.
Kasperson (1992) notes that several of their case studies suggest that

“economic benefits associated with the risky activity acted as a significant impediment to the emergence of negative responses and activism at the local scale.” (Kasperson, 1992, pg. 174).

This is seen to constitute a significant source of risk attenuation at the local level. This attenuation at the local level – or at least lack of intensification - is also noted by Metz (1996). He reviews key negative risk events at nuclear weapons complex facilities in conjunction with the economic consequences near these facilities and suggests, perhaps controversially, that there was no evidence of the latter resulting from the former. The explanation he gives is that the public’s “pragmatic logic” intervenes, (in the form of practical knowledge, experience and personal context),

“In other words, on the basis of its practical knowledge, the nearby public may attenuate its degree of concern as expressed through negative imagery and as suggested by the social amplification of risk model”. (p.186)

The anticipation of further positive economic opportunity is thus seen as being one factor underlying the decreased concern and actual support for a repository close to rural communities.

So what does the Shell case study say about the relationship between amplification processes and financial gain/economic benefit? Let us assume for the moment that the reaction and responses of the residents of Cowdenbeath are best characterised as attenuation (see section above). This begs the question as to exactly what is attenuated. Is it attenuation of the perceived risk, of the willingness to complain or resist, or is it rather related to a greater willingness to accept the risk? For example it could be that that plant was perceived to pose a considerable risk but that this risk was accepted in the light of the economic benefits that were associated with its development. Alternatively, it could be that the perceived benefits of the plant were associated with a reduction in the perceived risk. Risks may also be deemed acceptable because people are unaware of them. These processes are psychologically and substantively different and in order to understand ‘attenuation’ some attention should be given to unravelling them. Strictly speaking, attenuation as outlined within SARF simply refers to attenuation of the perceived risks, and thus instances where the perceived risks remain high yet appreciation of their benefit leads to acceptance of the hazard cannot be classed as attenuation. Within the SARF no distinction is made between these ‘types’ of attenuation and we would
argue that its predictive power would be enhanced were the processes that underlie this and other amplification phenomena to be articulated.

What indication is there within the data sources available of what exactly was attenuated for the Cowdenbeath residents? As noted above, MacGill (1982) suggests that the major driver of their acceptance of the plant was their welcome of the possible financial benefits. Certainly this was a very public aspect of the debate with the headline in the local paper being ‘Jobs Bonanza’. As far as perception of the risk itself was concerned, Macgill suggests that the risk was not denied but was considered to be less than the previous risks of a coal mining history that the community was part of. Thompson (1983a) expands this theme suggesting that the residents are dismissive of the risks entailed in LNG technology; that there are changes in the tolerance of the risks that they are prepared to accept, that is, that risk tolerance levels are attenuated

“not so much because they have clear perceptions of these risks as being lower than their questioners suggest, but because they need work and are prepared to accept a high level of risk to obtain it”.

Arguably then the evidence of this case study suggests that there is little evidence of attenuated risk perceptions, but appreciation of the potential benefits coupled with an unwillingness to complain gives the appearance of such attenuation. Rather, the threat of the plant was dealt with reference to greater risks that they had been exposed to in the past.

As noted in the previous section, secondary data is available that allows us to look at differences in the beliefs held by different communities about the hazard and its associated risks and benefits. However these data were collected in 1993 and 1996 and by this time it was very evident that the downstream industries and their associated economic benefits had not materialised. A strong theme of the data collected in Cowdenbeath focused on the resentments felt about the lack of benefits that had actually accrued to the community. This was in turn related to a perception of broken promises on the part of the companies and a recognition that people have long memories of these that impact upon other beliefs. Interestingly, the lack of job benefits also led the residents of Aberdour to question the honesty of the management and to the expression of anger and mistrust.
In conclusion then, it is being suggested that in order to understand the dynamics of amplification it is necessary to explore in greater detail the processes that underlie it. In communicating the ‘expert’ representation of the risk, there may be some value in explicitly including the potential financial gains that are associated with the hazard as this may help encourage processes of de-intensification and representation. It may be difficult to make economic trade-offs more explicit in this way without moving away from the notion of an absolute level of safety against which the acceptability of the site can be measured. Kunreuther (1983b) in relation to the siting of LNG facilities, whilst noting the close relationship between the question of acceptability of risks and the economic setting in which these risks occur, stresses that the picture is considerably more complex than simply siting in places where jobs are needed and not in more affluent areas where the risks are more likely to be viewed as unacceptable. It is in this area that more work is needed to delineate the processes at work within various publics that interact with qualities of the hazard and that are more or less likely to lead to toleration of the risks.

**Pressure groups**

It has been suggested that it is important to extend the range of amplification processes to encompass intensification, de-intensification, attenuation and de-attenuation as well as representation (see Main Report). One benefit of doing this is to obtain a coherent framework within which to locate the social influence processes that are operating in relation to any particular risk and how the activities of a range of groups may be directed towards these. This, in turn, will allow for a consideration of issues of power insofar as groups that are trying to exert influence are likely to have differential power to do so. Groups will also vary in the extent to which their activities are intentionally aimed at risk amplification. Both power and intentionality will affect the strategies that are chosen to effect influence and the success with which they are implemented. Supplementing the SARF framework in this way also allows for a more explicit consideration of the conflicts that can arise between parties – there are many parties, each of which has multiple goals and objectives that have to be prioritised. So even groups that at one level may agree on the overall aim may come into conflict about the way that this might be achieved, choice of strategies and the timing of their implementation.

At both time periods within the lifecycle of the Fife LNG facility it can be suggested that there were different groups (stakeholders) whose activities exemplified various processes of amplification and that adopted different strategies in order to achieve these. Perhaps the most noteworthy and well documented of these is the Aberdour...
and Dalgety Bay Joint Action Group (‘the Action Group’). Their aim was to stop planning permission for the Fife site being granted. They were active in their opposition to the siting of the plant in Fife. Their predominant concern was ostensibly safety issues.

**Pressure groups: defining themselves**

“*The Aberdour and Dalgety Bay Joint Action Group was an extremely determined, articulate and well organised pressure group that was self funded and notable for the extent of its indigenous expertise – both legal and technical*”. (Macgill, 1983a, p.117)

The way in which the group defined itself and other groups that it did or did not align itself with can be noted. This, in turn, affects the influence strategies that are adopted and may have implications for the extent of influence and for the strategies that other groups adopt in opposing it.

The Aberdour and Dalgety Bay Action Group resulted from a liaison between two villages, being formed from Aberdour residents and Dalgety Bay Ratepayers Associations. These villages are adjacent to each other in close proximity to Braefoot Bay. The initial concern of residents was focused on the effect of the proposed plant on ‘seals and gulls’ until alerted to the effects of ethylene by a Dalgety Bay resident who was a biochemist in Edinburgh Royal Infirmary. The group was born with a meeting of 12 people in the house of an Aberdour resident. By and large, they were a group of professional people including a Public Relations expert from the Scottish Office, a statistician, an industrialist, a chartered accountant and a banker. There began a period of ‘total slavery’ to the cause – typing letters, organising public meetings and beginning to develop audiences throughout Britain. Support for the group in both communities was believed to be fairly widespread and not simply confined to the main activists in the group. The extent to which residents from other areas felt that the Action Group would represent them and their concerns is unclear; it could be that the chosen name of the group excluded strong identifications of this type. Certainly the central concern of the Action Group was with Braefoot Bay.

“*I know it sounds selfish but we are not worried about Mossmorran…it is up to the people there to worry about that*”.

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3 Interview with B Grey, 11/7/00
Anecdotal evidence suggests that the relationship between the representatives of Aberdour and Dalgety Bay was strained at an interpersonal level in the early days. The two chairmen, one from each community, were not on speaking terms after one of them met with a Shell representative and accepted a lift from him\textsuperscript{4}. The cohesion of the Action group was in some sense diminished by the end of the campaign. This was illustrated in relation to the monies that had to be raised in order to pay the costs of the legal appeal which were mainly forthcoming from Aberdour residents. By this stage the Dalgety Bay residents were considered (by residents of Aberdour) to have become more remote from the issue having ‘run out of steam.’ Around the time of the opposition to the 3\textsuperscript{rd} jetty the people of Dalgety Bay were much less involved with protesting. In the intervening years the population of Dalgety Bay had roughly doubled in size and become much more transitory. Even those that had been involved were more reluctant to protest, for example, the feeling was expressed that the Action Group had been formed to stop the plant from being built, that they had failed in their efforts and that there was no point in protesting any more. For others there was perceived to be an element of self-preservation in terms of avoiding any toll that such protesting took upon time and health. There was a perception in relation to the time when the Action Group was most active that several supporters of the group had had their careers ‘sidetracked’ or had been ‘posted to far away places’. The strength of feeling that these issues aroused was such that even now over 20 years later, ‘there are still pockets where you can’t mention Shell and Exxon’\textsuperscript{5}

It can also be noted that the intensely professional public opposition of the Action Group stemmed almost exclusively from the local residents. Their efforts were not joined by any national environmental group. The Action Group considered that the indigenous expertise that they could call on exceeded any that a national pressure group could provide. Also, as the issue was so local they considered that bringing in outsiders would not be likely to help their cause (Macgill, 1982). Clearly however, there would also be financial constraints upon such a group obtaining expert advice. A final contributory factor to the group going it alone was that the public inquiry for Windscale, where by comparison there were far more implications for policy than at Mossmorran, was scheduled for the same time and thus national environmental groups were fully occupied elsewhere.

\textsuperscript{4} Interview with B Grey 11/7/00
\textsuperscript{5} Interview with B. Grey 11/7/00
The Action Group’s activity was professional and thorough. They had links with Lloyds of London in terms of monitoring shipping safety. They kept informed about any incidents that had occurred in similar plants around the world, visiting the US to extend their knowledge in this area and to monitor pipe line breakage’s that had occurred. They developed links with the national Scottish media in order to publicise their cause. They were the subject of “numerous newspaper articles and three television programmes which generally favoured the objectors rather than the proposers standpoint” (Macgill, 1983ap. 76). They researched trends within the plastics industry world wide in order to assess the likelihood of such downstream industry being sited in Fife.

Another ‘pressure group’ whose activities are documented in the secondary data available is the group of consultants (Dames and Moore) used by Shell to advise, about (among other things) the best way of handling the reporting of the SRA to the local communities. Obviously there are many differences between this group and the Action Group, however the important similarity is that in relation to the Mossmorran and Braefoot facilities, at different times both groups were active in trying to exert influence to achieve risk amplification. Arguably the Action Group directed their activities towards intensification of the risk and Dames and Moore/Shell towards de-intensification.

**Strategies used by the pressure groups**

At the time of protests about the siting of the plant, the Action Group was certainly aware of the arguments that they considered other stakeholders were likely to be swayed by. For example, they knew that the potential economic benefits were an important driver of the support of both Cowdenbeath residents and the local authority for the project. The Action Group countered this by formulating a range of arguments. They suggested that the local authorities were being gullible about the potential benefits to local employees and that this affected their judgement about the associated safety risks. Having assessed the plastics industry they argued that there was no reason for thinking that industrialists were going to be attracted to Mossmorran over and above many other potential sites. The Action Group suggested that there could even be a net loss in employment in the area rather than a gain if people presently employed in local industries left to work for Shell.
So in this way the Action Group took issue with the major benefit of the plant for the local community. However, the main thrust of their strategy was to dispute the representation of safety issues promoted by the other parties. They pursued several lines of attack. These were both procedural and substantive and are outlined here to give some indication of those ‘weaknesses’ and perceived inconsistencies that may serve to attract the attention of such pressure groups. This exercise will also give some indication of the range and content of arguments that were offered in support of the Action Group’s point of view.

As a preliminary comment it can be noted that these strategies vary in the extent to which they can be contested by the groups attempting to counter the amplification processes in question.

“The losers are the minority who perceive, however irrationally, the greatest risk and stand to gain no benefits, with reservations of a kind that existing political and demographic institutions have no answer” (Macgill, 1983b, p.274)

These reservations that have no answer are clearly exemplified in many of the letters of complaint that were written to the Council both in relation to the initial siting plans and concerning the proposed expansion of the 3rd jetty. Many of these draw attention to the ways in which the plant siting would or has led to unwelcome sights, smells and sounds.

“My friends and neighbours express concern at the glowing night sky, the noisy compressors on quiet evenings, the disruption to a boating trip by the closure of the Mortimers Deep Channel, the unfamiliar smells of venting hydrocarbons, the detour required on a shoreside walk to St Bridget’s church, the loss of the lovely picnic beach at Feryn Bay. These ubiquitous small intrusions result in damage to the clam of the whole village and a loss to the unique environment of Fife”

In relation to safety, it was clear that an important strategy of the Action Group was to cast doubt upon the credentials of other groups. This was done both by disagreeing with their ‘facts’ and also by casting broader aspersions upon the trustworthiness of the organisation in question. As far as the facts are concerned, throughout the whole of the planning permission process, the focus of the Action Group was that quantification of the risks was necessary before any judgements about how acceptable the risks are could be made. In contrast, the reports of the
HSE and Cremer and Warner (the risk consultants appointed by the Local Authority) were couched in non-quantitative terms, e.g. risks were ‘small’, ‘remote’, ‘non-credible’. The technical expertise that the local authority possessed to interpret these reports was considered to be inadequate.

At the later time period being discussed, the SRA results were expressed quantitatively in the report by Arthur D Little. Examination of the correspondence from various parties that were opposed to the further development of the plant reveals that on this occasion both the veracity and the relevance of such assessments were questioned.

“The least risky probability of dangerous dose described by the risk contours (means) there would be approximately a 1 in 3 million chance of death occurring in a year. By comparison the chances of winning the jackpot in the National Lottery in any week is 1 in 14 million. Yet every week a lucky individual wins” 7

“..their statistical probabilities are pretty irrelevant to someone who almost has a tanker in their garden and who does not know if their next breath will be their last” 8

“The risk assessment work presented seems to run counter to any form of common sense since virtually no increase in risk is predicted despite a 50% increase in the number of tanker movements” 9

“Risk assessment is a guess multiplied by a guess” 10

As well as taking issue with such substantive issues as the magnitude of the risk, the Action Group was also focused on more procedural issues. They considered that the local authority had criticised them, accusing them of scaremongering, before attempting to understand their fears and concerns. They suggested that groups such as theirs fight from more difficult ground than the other groups involved in the decision process, that is, their power to effect influence is constrained in ways that do not affect other stakeholder groups. For example, they believed that they were provided with less information than other parties and so their opportunities to prepare evidence for the public inquiry and for the subsequent investigation in relation to the radio sparks issue were prejudiced. Available finance and time to prepare and

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7 Letter to Dunfermline District Council, 5/3/95  
8 Letter to Fife Regional Council, 16/1/95  
9 Letter, 11/1.95  
10 Letter, 16/2/95  
11 Interview with B. Grey 11/7/00
pursue legal action for such groups is also considerably more limited than for national and industrial bodies. Similarly, the possibilities for such groups being represented by more traditional and powerful channels are minimal. The size of Aberdour and Dalgety Bay did not allow for substantial representation on local councils, thus those making decisions on their behalf would not be subject to the same safety considerations.

This links with the analysis of Kunreuther (1983b) where he distinguishes between parties that have power by virtue of *entitlement* or legal right and parties that have power by *standing*, “that is they have the right to participate in the decision process as specified by existing institutional arrangements”. The Action Group would be an example of such a party. Such constraints will mean that certain strategies for effecting amplification are not open to such pressure groups and, by the same token, will mean that other amplification strategies are more likely to be used.

It is clear that one particular stimulus to intensification processes were perceptions that procedures were unfair and militated against the Action Group being heard. One such belief was that evidence was unlikely to be given primacy within the adversarial context of a public inquiry. The group was also unhappy with the site specificity of the decision process considering it fairer if the strengths and weaknesses of several sites were considered in conjunction with each other. A further source of inequity was perceived in the fact that planning applications could be granted on very general grounds and revoked only on very specific grounds. Such perceived inequities undoubtedly stimulated the range and intensity of intensification strategies that the group displayed.

Dames and Moore were also a pressure group in the sense that, like the Action Group, their purpose was to effect social influence processes towards amplification of the risk. They were appointed in Dec.1996 to “identify and evaluate options for a public risk communications strategy”. This involved de-intensifying public reaction concerning the protests about the SRA and to set in place a risk communication strategy that would counter pressures to risk intensification on an everyday basis, hopefully leading to representation of the risk. The secondary data provide some evidence as to how Dames and Moore in conjunction with Shell went about this and what their concerns were in effecting these strategies.
It was clearly important for Shell to feel in control of the information that was communicated about the SRA. One obvious concern was to avoid the uncontrolled leakage of the information in the draft report into the public domain. Time constraints were perceived in relation to this process insofar as a delay may have led to the information being leaked from another group (Councils or the HSE). It might be suggested therefore that one motivation for effecting amplification strategies (in this case relating to de-intensification), or at least informing the timing of them, is when it is visualised that a lack of action at that time may lead to the opposite process (intensification).

Another strategy for de-intensification was found in relation to controlling who the results of the SRA were presented to. The suggestion was that placing constraints upon the nature and size of the audience would be less likely to result in conflict. Similarly, including key stakeholders in the audience was seen as desirable in terms of achieving ‘balance’. A further strategy for diffusing opposition was to introduce strategies for dealing with the Aberdour residents that were most sceptical about Shell’s motives for communicating the SRA results. Their views were perceived as being at variance with other sections of the community and it was suggested that this should be made evident by not meeting with Aberdour on their own so as not to indulge their views and asking ‘local professional people’ to be present to dilute their effect.

Clear and relevant communication was also considered vital in relation to communicating the substance of the SRA report and thus effecting de-intensification. The original report by Arthur D Little, the consultants who had carried out the SRA, was adapted for this purpose.

**HSE**

It is also clear from the secondary data that one strategy used by pressure groups to persuade and influence is to use the position of other groups to warrant particular courses of action. This is particularly evident in the present case study in relation to the Health and Safety Executive, whose position is interpreted and called on by different groups to validate particular arguments and courses of action. As far as the activities of the Action Group are concerned, the HSE were a particular target for their criticisms and the level of confidence in the regulators was identified as crucial in determining public judgements of risk acceptability.
It is instructive in this respect to note some perceptions of HSE that formed part of the Action Group’s attempts to intensify the risk; suggesting that little confidence was warranted in the HSE as scrutineers. As there have been changes both in the way the role of HSE is defined and in the way in which major hazard sites are regulated, there may little to be learnt from the substance of these complaints, although the general principles that they were seen to violate are likely to be important. The main point here is to note the way in which the regulator can be used to warrant the position of the pressure group itself.

Both at the time of the public inquiry and in relation to the proposed expansion of the plant the Action Group and the Aberdour residents respectively were unhappy with what they considered to be the superficiality of HSE’s responses. However, MacGill suggests that at least as important a source of low confidence in HSE were the perceived inconsistencies in HSE statements. For example, initially they said that marine matters would not fall within their remit and later said that they did. Similarly the pressure group identified an apparent inconsistency on the part of the statutory authorities – i.e. ‘to infer that large spills over Braefoot Bay were not credible appeared inconsistent with concern over whether radio transmission break sparks could ignite such spills’ (Macgill, 1983b, p.279).

It is perhaps indicative of the unusual nature of the Action Group that they also claimed that the technical expertise of the HSE was inferior to theirs, and that the safety standards adopted by HSE were less stringent than those often required abroad.

The Action Group also alleged that there was a lack of independence of the regulator from government and industry: The point made by Otway (Otway & Thomas, 1983) is that government, HSE, and industry thinking is aligned on many criteria of risk acceptability, so in this sense it may appear as if the regulator was not an independent body. For example, in relation to the reporting of the SRA, the representatives of Aberdour Community Council suggested that,

“Shell’s promotion of the SRA and the HSE position vis a vis those results have blown new life into the development of the plant.” 11

When interviewed, one of the founder members of the Action Group said that the HSE infuriated people by referring possible outcomes as being a ‘non credible

11 referred to in letter from Dames and Moore to Fife NGL plant manager 27/11/96
event’. To combat this, the strategy of the Action Group was to point out instances of ‘incredible events’ (e.g. Qatar – a modern plant destroyed in 1977). He said the image and role of the HSE was visualised as one that

“tells you to wear wired spectacles when you are breaking stones”

The HSE was also criticised in relation to propagating a system of ‘islands of responsibility’ vis a vis other regulators. This was perceived by the Action Group as the HSE washing its hands of the realities of the situation and taking refuge in the letter of the law.

Clearly then, the HSE did form a central reference point for the Action Group insofar as they were apparently expected to be a proactive and yet independent body.

The HSE was also used by industry to warrant particular courses of action. It was the intention of Shell, in communicating the results of the SRA, to bring the HSE on board at various points in the process. For example, they wanted the HSE to provide a public statement for Fife Regional Council saying that there would have been no objection to the planning application if it had gone ahead. In this way then, it was intended that the HSE should validate the results of the SRA, thus strengthening Shell’s claims about the low risks of the plant. Shell were also clearly aware of the way in which the regulator’s activity might work to their disadvantage. It was noted that the HSE might be the source of a leak of the SRA results insofar as they “can be forced under existing legislation to respond to public queries.” The HSE was also used as the benchmark in communicating the results of the SRA which had concluded that

“..the levels of risk from shipping operations to the local community were very low and well within limits used by the Health and Safety Executive”.

It is clear then that the regulator is represented by different parties involved in negotiations about the hazard. Such representations can be used to warrant or discredit particular courses of action. It is therefore important to consider how the regulator should operate in such a context. It might be suggested that one strategy is for the regulator to be more visible in promoting a representation of itself as it is otherwise unlikely that a position of neutrality and independence will be inferred.

This is more likely to be gained through communicating an active presence. In order for this to be successful, the HSE as a central actor in many situations where issues of trust are predominant needs to have a careful understanding and appraisal of amplification processes (intensification, de-intensification, attenuation, de-attenuation and representation) for all parties involved. This may in turn go some way to
changing the representation that government, industry and the regulator are aligned in their beliefs about risk acceptability (Otway et al., 1983).

Further work is needed to explore the ways in which perceptions of the regulator’s independence could be fostered as well as how different pressure groups implicate the regulatory authority.

**What is ‘winning’ for a pressure group?**

Finally, it might be asked what needs to happen for a pressure group to consider that they have been successful and what the effect of a single issue pressure group might be. Answers to such questions will have an important bearing on the resources that are allocated to anticipating the activities of such groups and working effectively with them to ensure optimal outcomes.

At the time the Action group considered themselves to have failed when permission was given for the LNG facility to be built in Fife. With the perspective of hindsight, their belief was that the group did have an effect in that they made the plant safer than it otherwise would have been. They claimed to have raised issues that would not have otherwise been openly debated. This was denied by HSE. Whatever, the Action Group can certainly be seen to have had a role in keeping those concerned with safety issues on their toes. They also considered themselves responsible for the imposition of particular planning conditions (i.e. the requirement for a safety and operability audit) when permission for the site was granted.

There is no doubt that the activities of the Action Group did make a difference and had a number of tangible effects. They caused a delay in the building of the plant mainly by raising the sparks issue that, in turn, led to a delay in the decision to grant planning permission. The group were apparently accused of costing 200 million pounds by causing the delay and there is a huge tanker still standing in the site at Braefoot Bay that was allegedly never used because of this.

MacGill suggests that overall they were

> "determinedly opposed to the developments, improved the range and degree of detail of the safety debate and caused it to be more widely and publicly examined" (1983b, p.267)
Internal Shell correspondence also indicates that the decision to appoint Dames and Moore to advise in relation to developing a coherent risk communication strategy was prompted, at least in part, by the reaction of Aberdour residents to the SRA results.

Hazard negotiations

This case study illustrates the way in which processes of social influence and of conflict characterise many hanging negotiations. One aspect of this is that over time such negotiations involve dealing with a number of different hazards. Within the overall hazard there are a number of different hazard structures (sub-hazards) and at different times these will become the focus for the amplification strategies of interested parties.

In the current case study, the overall hazard relates to the siting, construction and operation of a LNG plant. However, within this, over the lifetime of the hazard there have been ‘sub-hazards’ that have become the focus of amplification strategies of different parties. For example, the SRA became a focus for the de-intensification strategies of Shell, safety concerns became the focus for the intensification strategies of the Action Group in relation to siting the facility.

In some instances it may seem that a sub-hazard is exogenous and that the attention it subsequently attracts is unavoidable. Examples of sub-hazards in this category in relation to the Fife plants might include the ‘Havkong’ incident and the focus on Benzene. It is clear that even with sub-hazards that are constituted by an event, as in these two cases, there is negotiation about the way they are perceived and other events that they are linked to. Other hazards are less ‘event based’ and more clearly negotiated into the public eye. One constraint upon the way in which this takes place relates to procedural regulations.

The post inquiry period was dominated by the debate in relation to the possibility of escaping gas being ignited by radio sparks. MacGill suggests that the emergence of this as a major issue resulted from the matter being taken up by the Joint Action Group. The Action Group also noted that the delay and debate that this issue occasioned brought an apparent inconsistency into focus, i.e. ‘to infer that large spills over Braefoot Bay were not credible appeared inconsistent with concern over whether radio transmission break sparks could ignite such spills’ (Macgill, 1983b, p.279). More than one round of exchanges between the HSE and the public went on.
This sub-hazard was negotiated into the public arena by the Action Group although they themselves, as well as the other parties, agreed that it constituted a relatively minor concern when set in the context of the other safety concerns of the plant. However, the close of the Inquiry meant that additional relevant evidence (such as the Action Groups own quantitative risk assessment for Braefoot Bay, based on the methods used by the HSE in the Canvey report and verified by an independent firm of consultants) could not raised or debated. Thus these procedural requirements facilitated the introduction and negotiation of a ‘new’ hazard, which was used by the Action Group to try and stimulate further intensification. It was recognised that raising this issue was a way in which the Action Group could delay the outcome of the Public Inquiry, thus keeping their hopes alive.

It is also the case that events that might be said to have the potential to become a sub-hazard never receive the public and media attention that they might be expected to. Senior plant staff gave an example of an event they believed fell in this category. A local GP was reported in the local papers as saying that he felt there had been a rise in the numbers of respiratory diseases that were attributable to emissions from the plant. This was an issue that plant management felt ‘could escalate into another benzene type issue but it didn’t’. This was thus never negotiated into being indicative of a hazard. This incident is also illustrative of the way in which Shell personnel had become sensitised to the way in which such incidents have the potential for intensification of the risks.

The notion of hazard negotiations has implications for the regulator. The fact that amplification processes are selective (the focus for a pressure group today will not necessarily be the focus of tomorrow) has to be balanced against the findings of a risk assessment which assesses all things at all times. (Indeed it may be this that accounts for the success of pressure groups at times).

Critical points

“Information or events which shift a hazard from one social representational anchor to another are critical points in the process of social amplification of risk.

The literature within SARF in this area refers to a similar notion, that of ‘take off’ of an event (Kasperson, 1992) and also suggest that there may need to be a particular combination of factors present to ensure takeoff. However, the notion of critical
points is not synonymous with the take-off of an event. We would argue that the
notion of critical points more readily encompasses the notion of attenuation of the
risks as well as changes in the nature of the representation of a risk that are not
simply concerned with its initial trajectory into the public consciousness.

We might then ask about what sort of events or information are likely to have this
effect, or about the circumstances under which are they likely to have this effect. On
the basis of the literature and these case studies several suggestions can be made.
It is not necessary that an event or information has to have all these qualities –
however, it is unlikely that a shift in representation will occur independently of these
critical point triggers.

- Some significant group paying attention
- Off stage occurrences - They are coterminous, apparently extraneous events
  that add significance to the hazard event in question.
- The skilled intervention in the course of the event - the evidence of new skills,
  information or a new interpretation. This may be in the form of new personnel.
- Change in the cost benefit equation
- New element of the hazard
- Inertial strength - this draws attention to the importance of changes in the power
  balance to determining the nature and timing of critical points. It focuses upon
  the way in which the resistances in the context may change. The role of power in
  amplification processes is an aspect of SARF that is, as yet, underdeveloped.
  Changes in the inertial strengths can come from a number of sources that may
  or may not be directly related to the hazard in question – they may be related to
  off-stage occurrences. For example, the way in which the SRA episode was
  handled can be seen as strongly informed by the effect of the Brent Spar episode
  upon Shell. Following this there had been a major change in the corporate
  culture of Shell. It had become reputation risk conscious and adopted a
  corporate approach to stakeholder relationships on environmental health and
  safety issues: engage not enrage. The risk communication strategies taken by
  the company during Brent Spar have been characterised as being ‘top down’;
  “they alienated the public immediately and came across as arrogant and
  unmoveable” (Löfstedt & Renn, 1997). In contrast afterwards they appointed a
  Reputation and Issues Manager and began to introduce a more systematic
  approach to issues identification. Shell learned
“that in the ‘show me’ world, we must be more open and transparent. In controversial matters, good science and regulatory compliance are not enough…. Dialogue does not remove our real responsibility to make our own decisions. Dialogue can help us ensure that our corporate values are aligned with those of our stakeholders” (Faulds & Morrison, 1998)

The notion of inertial strength may be particularly important insofar as it draws attention to the way in which events that may not seem not seem hugely significant in and of themselves can assume the status of a critical point in triggering a change in the risk representation (‘the straw that breaks the camels back’) when the event indicates that the balance of power has changed in a critical way.

Considering inertial strength also allows us to make explicit the way in which, in relation to any hazard event, there are different groups that are exerting influence to achieve different states of amplification. The ways in which different groups gain or maintain the upper hand and the way in which these power balances shift thus becomes crucial. The analysis above suggests that pressure groups may be quite adept at identifying and targeting particular areas of resistance. In understanding the way in which groups attempt to amplify risks it would seem important to understand the resistances to particular amplification processes that exist.

Within this framework consideration can be given to the way in which critical points for natural and man made hazards differ. It may be that the elements are the same but the resulting amplification processes show different patterns because of the operation of different resistances.

CONCLUSION

This case study has suggested several ways in which it is necessary to refine the tools offered within SARF if the framework is to be of assistance to government in managing risk and the process of risk communication. It is recognised that government agencies have already learned some of the lessons emerging from this case study and that the demands upon risk communication practice are continually changing. A key emerging theme of the present research relates to the social influence strategies of interest groups in their bids to effect risk amplification. Clearly the regulator can be used by such groups to warrant particular courses of action. The actions of the regulator are crucial in determining the extent to which this
occurs. This affects the risk amplification processes that occur including hazard negotiations and critical points.
## Appendix 1: Fife NGL timeline

<table>
<thead>
<tr>
<th>Dates</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1976 - July</td>
<td>Shell/Esso contact Fife authorities to discuss the potential of Mossmorran to accommodate NGL plant and ethylene cracker (having withdrawn application to site it at Peterhead)</td>
</tr>
<tr>
<td>1976 - Oct</td>
<td>Dalgety Bay residents reported to have alerted local population to the hazard potential of the plants. Concern also voiced over yachting and other amenities, environment, and ecology. There was immediate opposition. (Scotsman, 28/10). At same time local and district councillors voiced their approval of the plans</td>
</tr>
<tr>
<td>1976 - Nov</td>
<td>Shell declare intention to submit planning application for sites at Mossmorran and Braefoot Bay. Aberdour ratepayers are instructed by their members to protest to the Secretary of State in the strongest possible terms. Concern expressed over yachting and marine safety. Local government leaders welcome the plan since local employment benefits will far outweigh environmental costs. Opposition to the proposals from Aberdour and Dalgety Bay grows showing ‘early mistrust of local authorities and of decision procedures’. Scepticism expressed on job prospects, the ‘independence’ of local authorities in assessing impacts. Cynicism over relevance of Public Inquiries</td>
</tr>
<tr>
<td>1976 Dec</td>
<td>Shell and Esso, encouraged by local authorities held public meetings in Dalgety Bay, Cowdenbeath, Aberdour to explain their proposals.</td>
</tr>
<tr>
<td>1977 - Jan</td>
<td>Esso declare intention to submit planning application for sites at Mossmorran and Braefoot Bay. 20th Jan: Shell submit planning applications for NGL plant and associated facilities Fife local authorities brief Cramer and Warner (private independent consultants) to report on the hazard and environmental impact of the Shell/Esso proposals. (This was the most substantial report on hazards produced during the process)</td>
</tr>
</tbody>
</table>

12 Prior to 1980 these details are taken from McGill (1982)
<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1977 - Feb</td>
<td>Esso submit planning applications for ethylene cracker and associated facilities. Secretary of State ‘calls in’ the NGL plant application and thus becomes THE decision taker. Aberdour Ratepayers and Dalgety Bay Residents Associations combine to form a joint action group to fight the proposals. They ask the Scottish Development Dept (now the relevant authority) for a Planning Inquiry Commission. This request was refused.</td>
</tr>
<tr>
<td>1977 - March</td>
<td>Esso submit planning application for downstream development for rest of Mossmorran site Secretary of State ‘calls in’ the ethylene cracker application</td>
</tr>
<tr>
<td>1977 - April</td>
<td>Secretary of State ‘calls in’ the downstream development application Public exhibitions held by Shell/Esso and local authorities in Dalgety Bay and Auchtertool to explain proposals in greater detail. Joint Action Group ask Scottish Development Dept to discuss possible alternative sites for the proposals. Little reaction and objectors consider the odds to be stacked against them.</td>
</tr>
<tr>
<td>1977 - May</td>
<td>Action group mount exhibition in Edinburgh to publicise danger of plant. On same day as relevant district and regional councils officially approve planning applications in principle.</td>
</tr>
<tr>
<td>1977 - June</td>
<td>Joint Action group ask for postponement of Inquiry. Not granted</td>
</tr>
<tr>
<td>1977 - June 27/July 21</td>
<td>Public inquiry into all applications is held</td>
</tr>
<tr>
<td>1977 - November</td>
<td>Inquiry reporter submits report to the Secretary of State. Sec of State says he expects to announce his decision by end of year.</td>
</tr>
<tr>
<td>1978 - January</td>
<td>Joint Action group raise issue of radio spark ignition hazard - an issue completely overlooked at the public enquiry</td>
</tr>
<tr>
<td>1978 - March</td>
<td>Secretary of State indicates provisional approval of the planning applications but asks for further evidence on the radio spark ignition hazard.</td>
</tr>
<tr>
<td>Date</td>
<td>Event</td>
</tr>
<tr>
<td>-----------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>1978 - June</td>
<td>Court of Session in Edinburgh rules that report on radio spark ignition hazards should be released to the Action Group</td>
</tr>
<tr>
<td>1979 - January</td>
<td>Fife Councillor estimates the delay in decision to be costing the nation 200mill p.a.</td>
</tr>
<tr>
<td>1979 - May</td>
<td>Change of Secretary of State; short parliamentary debate on Mossmorran</td>
</tr>
<tr>
<td>1979 - June 19th</td>
<td>Representatives from the action group go to London to present case directly to MP’s. Few attend</td>
</tr>
<tr>
<td>1979 - August 9th</td>
<td>Secretary of State gives approval for developments, i.e. grants outline planning permission subject to a large number of conditions</td>
</tr>
<tr>
<td>1979 - October</td>
<td>Action group lodge and appeal with the Court of Session against the validity of the decision of the Secretary of State on the ground that is was not within the powers of Section 32(1) of the Town and country Panning (Scotland) Act 1992.</td>
</tr>
<tr>
<td>1979 - December</td>
<td>parliamentary debate on safety aspects of Mossmorran - Braefoot Bay initiated; abandoned for exceeding time limits</td>
</tr>
<tr>
<td>1980 - February</td>
<td>Court of Session reject Action Group’s appeal against the Secretary of State</td>
</tr>
<tr>
<td>1980 - March</td>
<td>Construction plant on the NGL plant commences</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Period</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>80's/early 90's</td>
<td>No information - no particular incidents ever referred to</td>
</tr>
<tr>
<td>1993 Jan</td>
<td>Community Attitude Survey - indicated that relationships with the local community left a lot to be desired. Low trust/knowledge</td>
</tr>
<tr>
<td>Oct.1994</td>
<td>Shell applies to Fife council to build 4th processing module at Mossmorran and 3rd jetty at Braefoot bay (Application withdrawn in early 96. Fife council, on advice of HSE, asked that Shell carry out an SRA as part of the planning application</td>
</tr>
<tr>
<td>18/24 Jan 95</td>
<td>Public meetings in Dalgety/Aberdour re expansion of NGL plant - see 27/2/95 letter from L.Gibson/Aberdour Boat Club</td>
</tr>
<tr>
<td>Dec 94 - mid 95 early 96</td>
<td>Letters of objection</td>
</tr>
<tr>
<td></td>
<td>Application withdrawn - due to changing business circumstances</td>
</tr>
<tr>
<td>Event Date</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Slightly later</td>
<td>Shell Reputation Management Strategy document - how to handle presentation of SRA in the light of withdrawn application</td>
</tr>
<tr>
<td>7/96</td>
<td>Planned presentation of SRA by Arthur D Little</td>
</tr>
<tr>
<td>July 96</td>
<td>Media statement re reporting SRA to councils</td>
</tr>
<tr>
<td>June 5th 96</td>
<td>Copy of overheads used in SRA presentation to councils</td>
</tr>
<tr>
<td>5/9/96</td>
<td>Proposal for Community Attitude Survey</td>
</tr>
<tr>
<td>7/96</td>
<td>Fife NGL plant environmental report for 95 released</td>
</tr>
<tr>
<td>10/9/96</td>
<td>Press Release re Vapour Recovery Unit for Braefoot Bay - to be constructed mid 97</td>
</tr>
<tr>
<td>11/11/96</td>
<td>Community Attitude Survey</td>
</tr>
<tr>
<td>13/11/96</td>
<td>Letter to Dames and Moore (D&amp;M) giving background relevant to developing community communications strategy</td>
</tr>
<tr>
<td>19/11/96</td>
<td>Draft questionnaire for Quantitative Survey</td>
</tr>
<tr>
<td>27/11/96</td>
<td>Letter from D&amp;M to plan manager Fife NGL re possible ways of developing community communications strategy.</td>
</tr>
<tr>
<td>Early 97</td>
<td>Summary of community activities Fife NGL is involved in</td>
</tr>
<tr>
<td>13/2/1997</td>
<td>Dames and Moore Report on Community Communications Strategy</td>
</tr>
<tr>
<td>Later in 97</td>
<td>FNGL reputation management strategy (based among other things on D&amp;M study)</td>
</tr>
</tbody>
</table>

Reference List


ANNEX SEVEN

AMPLIFICATION OF RISK IN THE INTERNATIONAL ARENA: THE CASE OF MOX DATA FALSIFICATION AT SELLAFIELD, BNFL

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AMPLIFICATION OF RISK IN THE INTERNATIONAL ARENA: THE
CASE OF MOX DATA FALSIFICATION AT SELLAFIELD, BNFL

INTRODUCTION

It was decided that it would be useful to test some of the interpretative framework
developed from the secondary analysis of data in the four prime case studies on a live
hazard notification. In September 1999, the UK national newspaper, The Independent,
alleged that BNFL inspectors had falsified quality control data on mixed-oxide (MOX)
pellets produced at its Sellafield Mox demonstration facility. This allegation was
accepted as correct by BNFL immediately. In fact, the falsification had been discovered
by its own control team. This revelation seemed likely to be subject to social
amplification of risk processes if the models that we had developed from earlier case
studies were correct because:

- This was part of a sequence of hazard notifications associated with BNFL over a
  long period;
- BNFL's possible future as a partially privatised company is actively being considered
  and its financial viability is a major political concern, any challenge to its plans for
  global market penetration as a nuclear fuel reprocessor is bound to be of great
  political significance;
- BNFL is subject to attacks from highly organised pressure groups;
- BNFL is in the business of handling nuclear materials that arouse great fear for large
  numbers of people and they do not see the company to be serving the public
  interest;
- BNFL has been consistently attacked by high profile campaigning journalists in the
  recent past;
- The subject matter of the hazard notification was complex and open to easy
  misrepresentation and thereby risk exaggeration.
Consequently, we chose to conduct an analysis of the Mox incident. Given the time and resources available for this analysis, it was not possible to employ the full layering method. The analysis focused upon examining the press coverage of the incident and its consequences. In this, it specifically focused upon the role of the regulator (the Nuclear Installations Inspectorate, NII). It also explored attempts by BNFL to engender de-intensification processes and how they were received or represented. The UK press coverage from September 1999-July 31st 2000 was examined.

A BRIEF NOTATED CHRONOLOGY OF THE MOX INCIDENT

Mox is mixed oxide fuel. It is produced by mixing plutonium oxide, separated during the reprocessing of spent nuclear fuel, with uranium oxide. It is used in nuclear reactors in a number of countries as an alternative to the conventional fuel made of uranium oxides.

The incident of data falsification took place at the Mox Demonstration Facility (MDF) at Sellafield. Sellafield MDF manufactures mox pellets and incorporates them into fuel assemblies for use in nuclear reactors. Each pellet produced passes through a fully-automated laser micrometer which checks and records the diameter at three points along its length, giving a 100% automatic check on all pellets used in a fuel rod. Wrongly sized pellets are automatically rejected. Those whose diameter falls within the specified tolerance pass onto the next stage, where each undergoes further visual checks. As a confirmatory check on diameter and in accordance with the 1% Acceptable Quality Level criterion set out in British Standard BS6001, a sample of 200 pellets, which have passed through both checking stages, is measured a second time. This quality check uses a similar laser micrometer, but the sample pellets are presented to the micrometer by a process worker who types each measured diameter into a computer spreadsheet. On 20 August 1999, a member of the MDF Quality Control Team identified similarities between the secondary diameter data for successive batches of pellets. After further investigation, BNFL reported to NII on 10 Sept that some of the checks on fuel manufactured for a Japanese customer appeared to have been falsified by copying data between spreadsheets. NII launched an investigation and an independent analysis of the data to determine the extent of the falsification.
10 Sept 1999: The Independent indicated to BNFL that it intended to publish an article concerning the falsification by BNFL process workers of data on Mox pellet diameter.

14 Sept 1999: Independent headline: "Inspectors sent in as Sellafield admits to serious safety lapses". The quality data from previous samples had been used instead of running required checks. On the same day, BNFL issue press statement saying that it was investigating the falsification of data relating to the fuel pellets. In this statement, BNFL said that "BNFL is confident that the pellets fully meet the specification due to extensive supporting quality data. There are no safety issues associated with falsification of this product quality data."

Note: Already at this point, media coverage was conflating the issue of safety with the issue of quality control.

16 Sept 1999: The BNFL Annual Report discloses significant operating losses. This is interpreted as making it unlikely that the government will wish to continue with plans to sell off half its stake in the firm before the next general election.

Note: The risk that partial privatisation of the company would not eventuate is an ongoing theme throughout the period of analysis. This is a hazard for BNFL which provides the backdrop to all other hazard reports associated with the company.

22 Sept 1999: 32 Mox assemblies aboard the transport vessel Pacific Teal, that had been in transit at the time of the initial revelation of falsified data, arrived in international waters offshore from the Fukushima Daiichi nuclear power plant (NPP). NII wrote to Japanese Embassy in London to explain that it would take some time to check all the data relating to this fuel that was currently en route to Japan. This letter interestingly added that NII understood that BNFL had already told the Japanese team visiting Sellafield that one lot of the mox fuel pellets whose secondary sample checks on diameter had shown "unusual results" had been used in the manufacture of two fuel assemblies then en route to Fukui. BNFL, on the same day, issued a statement that, while the initial investigations had revealed falsified data relating to 11 fuel batches, they had now identified 22 affected batches. All 22 batches had been prepared for the Takahama Unit 3 NPP and had not left Sellafield.

Note: No dramatic action, symbolising the protection of the customer, such as the recall of the shipment that was at sea when the original announcement was made, was taken. This contrasts markedly with the measures taken by other companies in other industries.
where quality control errors had occurred (e.g. Perrier withdrawing its bottled water from all shops after some evidence of contamination was identified). Evidence of concern for the customer and quick action in other incidents has been associated with processes of attenuation of risk. Notably BNFL did not take such action - their stance was that this was not a safety problem and no one was at risk - **at this point** they were arguing publicly that none of the mox assemblies that were suspect had left Sellafield. However, the NII letter to the Japanese is reported to state that BNFL had already indicated to the Japanese that there could be irregularities in two of the fuel assemblies that were on board ship.

30 Sept 1999: There is a breach of safety regulations concerning the handling of enriched uranium and an off-site radiation leak occurs at a nuclear plant in Tokaimura in Japan. This receives media coverage internationally being rated as Japan's worst nuclear accident. It causes immense public anger in Japan.

2 October 1999: "The fallout from the Japanese nuclear disaster could severely damage British Nuclear Fuels business interests and increase UK safety concerns". The Guardian. The Japanese plant where the accident occurred was privately owned and workers were said to have cut corners to speed up processes. The parallel with what might happen in the UK if BNFL was privatised was drawn.

**Note:** The Tokaimura incident might be said to have made it more difficult for Japanese government officials to ignore the mox incident or accept BNFL's assurances. By 7 October, the Japanese customers had stated that the mox delivered was "within specification". However, the Japanese government was considering asking them to delay using the fuel. This was linked with the public antagonism to nuclear fuel caused by Tokaimura. Tokaimura can be seen to be an important instance in the hazard sequence that potentiated major intensification of the mox incident.

22 October 1999: A link between stillbirths and increased doses of radiation is reported in a study of fathers who work at Sellafield reprocessing plant. The empirical basis for this claim was challenged by BNFL but interestingly their press release did not receive media attention.

29 October 1999: The UK government is accused by "green campaigners" (reported in the Guardian) of considering "turning the country into a permanent nuclear waste dump for BNFL's overseas customers just so that it can make privatisation of BNFL easier."
7 November 1999: BNFL reported to have drawn up a plan to increase its future business by reprocessing fuel from its own Magnox reactors at THORP. This is seen as a way out of the uncertainty associated with German and Japanese markets for reprocessing.

2 December 1999: The Independent reports that Bradwell, one of the UK’s oldest power stations is to close in March 2002. It states that this decision is made on economic rather than safety grounds. The closure announcement is tied to concerns about the serious backlog of radioactive waste being held in tanks at Sellafield. NII had told BNFL to clear the backlog but it is reported to be likely to fail to do so.

Early December 1999: Kansai Electric Power Company representatives were sent to Sellafield at the request of the Japanese Ministry of International Trade and Industry (MITI) to reconfirm data checks had been properly conducted.

13/14 December 1999: Meeting between NII and Japanese Ministry of International Trade and Industry. NII confirms that 2 assemblies are "suspect".

16 December 1999: The Guardian reveals that the NII had warned the Japanese government on November 8 that two fuel assemblies made at Sellafield were suspect on safety grounds. Interestingly, a copy of this letter was placed in the House of Commons Library. This disclosure causes embarrassment to both BNFL and Kansai Electric which had planned to load the fuel into reactors within the next month. Only now do BNFL publicly acknowledge new data irregularities in the second lot of the mox fuel. NII inform MITI that two more assemblies are affected (i.e. a total of four out of the eight in the shipment). BNFL "apologise to both Kansai and the Japanese regulators for all the inconvenience caused by this unfortunate accident." On the same day, the Japanese suspended all Mox imports from BNFL and the Kansai Electric Company rejected all use of BNFL Mox fuel and accused the company of being untrustworthy. Fukaya, Japanese Industry minister, said; "We're losing trust in BNFL". Helen Liddell, the UK Energy Minister, demanded a full explanation from Hugh Collum (BNFL's Chairman) "of this clearly unacceptable failure by management." Liddell apologises to the Japanese ambassador in London for BNFL's mistakes.

Note: At this point, it became public in the UK that the NII report had concluded that "based on statistical analysis, some of the data from the secondary sample checks on pellet diameter have been falsified and some further data should be regarded as
suspect. Two of the assemblies containing suspect data are in Japan." This was reported in the UK press as having been kept secret on the grounds that "no one in Britain is endangered by the falsified safety checks. The only people who might have been were Japanese and they were outside our jurisdiction so we have no obligation to publish". This reportage implied NII was unnecessarily secretive. In fact, there is no evidence that NII intended to be unnecessarily secretive. BNFL denied that it had misled the Japanese: "We said that none of the 22 batches of fuel with proven falsified data had been sent to Japan. We said that the customer Kansai was confident that the fuel we sent them was safe. We said nothing about assemblies containing pellets that were suspect." In fact, it turned out that the ship which had arrived in Japan during the initial revelations did contain two assemblies that "were suspect". In fact, BNFL had clearly omitted to tell the Japanese the full details surrounding the mox incident. There appears to be some doubt as to whether they had actually told the Japanese inspectors who had visited Sellafield anything about the suspect assemblies already dispatched - NII is reported to have thought that they had informed them about two. This was not reported by the press to have been confirmed by any other source.

By this stage, the fault in BNFL is not seen as a difficulty lodged at the level of poor practice in the data checking team of a small unit within the company, it has been expanded to be seen to be as a symptom of more widespread lack of control and honesty by management at the most senior levels.

Also by this stage, the incident has become a matter of international politics - largely because of the financial value of the contract at stake.

Greenpeace International is quoted in the media as saying that "There are clearly no limits to the extent of BNFL mismanagement when plutonium is involved. All plutonium Mox fuel production should be cancelled." This is the very simple message that the green lobby re-iterate throughout.

18 December 1999: Kansai Electric Company in Japan said it would return the first mox consignment that had arrived there.

23 Dec 1999: UK and Swiss media claim that the Swiss nuclear authorities has discovered a new case of falsified Mox data. At this point, the NII reveal that they had contacted the Swiss inspectorate to tell them that the suspect data should not affect the
safe operation of the fuel. The Swiss inspectorate state that they have found a manufacturing fault in one rod. BNFL emphasise that the problem found by the Swiss is unconnected to the data falsification incident and that the type of problem the Swiss had found "is a fairly common occurrence with no safety implications".

20 Jan 2000: Kansai Electric Power Company suspends all contractual dealings with BNFL, with extensive press and media coverage in the UK.

8 Feb 2000: UK DTI delegation visits Japan to apologise for BNFL failures. John Taylor, BNFL Chief Executive, visits Japan to apologise to BNFL customers and to the Japanese government.

18 Feb 2000: UK NII publishes 3 highly critical reports into BNFL's operations at Sellafield. (See next part of this report for summary of the report concerning data falsification). Extensive media coverage follows, particularly because the reports reveal management flaws (concerning carbon-14 emissions) at Hinkley Point nuclear power station too. Political criticisms of BNFL's handling of the issue are made are the highest levels. BNFL dismisses 3 process workers and issues disciplinary warnings to 10 others. BNFL publishes its own "Review of the Mox Demonstration Facility Secondary Quality Control Data Falsification Issue" by John Taylor. BBC coverage extensive, quoting at one point Gaia Hoerdner of the Centre of Nuclear Information in Tokyo "Japanese companies have totally lost face because they received this defective quality controlled fuel and it is very unlikely that they are going to resume trade with BNFL again."

19 Feb 2000: The Times claims data was falsified because staff were "bored".

20 Feb 2000: The Independent ran headline "Sellafield lied about safety to Germany too", announcing that fuel with fabricated safety data was sent to Germany as well as Japan.

22 Feb 2000: The Irish government reported to have called for shutdown of Sellafield.

23 Feb 2000: German environment ministry announced temporary suspension of Mox nuclear fuel shipments from Sellafield. Extensive media coverage in both UK and Germany.

26 Feb 2000: Iceland government reported to have asked for closure of Sellafield.
Note: The incident is by this stage clearly having impacts on both the national and international political scenes. The fact, in Japan, that BNFL is dealing with a culture that has quite different expectations concerning blame and acknowledgement of guilt does not seem to have impacted sufficiently on the company's management of the incident. Processes of de-intensification that might have been used, are not introduced as a consequence.

27 Feb 2000: BNFL Chief Executive, John Taylor, resigns.

28 Feb 2000: Friends of the Earth call for "a change in policy not people" at Sellafield. This is taken up and reported the following day by The Times.

1 March 2000: BNFL announce that Taylor to be replaced as Chief Executive by Norman Askew on 13 March.

Note: The move is seen as too little, too late in most parts of the media. It is not seen to be tackling the core structural organisational problems that created the Mox incident.

5 March 2000: The Observer runs story with headline: "BNFL's 'unsafe' uranium seized"

7 March 2000: Greenpeace press statement: manipulations of laser measurements cast new doubt on safety of BNFL nuclear fuel. The Independent states that BNFL had lowered safety standards to boost output.

8 March 2000: The Independent, following Greenpeace, claimed BNFL had changed the method for measuring diameters of Mox fuel pellets without telling NII.

9 March 2000: The Independent claims the future of Sellafield is in doubt after the German ban on BNFL shipments.

20 March 2000: In light of Mox incident, UK government decide to review award of a contract to BNFL to manage the Atomic Weapons Establishment at Aldermaston.

24 March 2000: Swiss government's federal nuclear safety inspectorate announce ban on BNFL fuel consignments. The Independent reports that BNFL activities in the US were already under investigation by the US Department of Energy. The Daily Telegraph argues that the US safety inquiry threatens BNFL sale.

Note: Throughout the period, the underlying question of BNFL's future partial privatisation is raised. The challenge that it cannot be economically viable and safe is regularly made.
26 March 2000: Sabotage of wiring of robot arms in high activity waste facilities by a BNFL worker at Sellafield is revealed in the national press and TV. The incident had occurred some weeks before this revelation since the trades unions and Special Branch were already involved.

27 March 2000: The Guardian newspaper reports that the UK Government is expected to abandon nuclear reprocessing altogether at the Sellafield plant.

Note: during the period Jan-March 2000, The Independent ran 43 headline stories about BNFL and the Mox incident (14 by Steve Connor the Science Editor, 12 by Michael Harrison the Business Editor); The Guardian ran 37 (14 by Paul Brown the Environment Correspondent); The Observer ran 4 (all by Oliver Morgan); The Daily Telegraph ran 18 (with no noticeable attachment of a specific journalist); and The Times ran 20 (with no specific journalists attached). This meant that barely a day went by without one of the major daily broadsheets criticising BNFL operations or financial viability.

3 April 2000: The Independent reported that BNFL was to replace its Mox plant managers and this was followed by a claim that Helen Liddell, the energy minister, had said sackings would be widespread. By 17 April, 45 supervisors were reported to be scheduled for the sack. Interestingly, it was suggested in The Independent that BNFL had leaked details of sackings in order to limit damage. In fact, on 18 April BNFL announced that six non-executive directors were to be replaced in "a one shot shake up". 70 new jobs were created to ensure safety. Three key directors were to leave (human resources, finance and safety). The new Chief Executive said this represented a fresh start for Sellafield. Liddell said it was a "rescue plan." Laurence Williams, the Chief Inspector of NII, said the plans "provided a good foundation to deliver the necessary safety improvements. Greenpeace said that BNFL was not addressing the fundamental problems with its business.

Note: At each new announcement in the saga, the media would repeat in brief the details of the original data falsification. This served to represent the safety hazard to the public, but attached it to new images of disarray at BNFL. Even the management shake up was treated as a sign of earlier incompetence rather than symptomatic of a willingness to tackle the problems. The mind set of the media on this was one of unrelenting attack linked to pessimism about the future; typified by the last sentence in The Independent article on 18 April: "The string of safety scares led the government to shelve plans to privatise Sellafield for at least two years."
19 April 2000: Norman Askew, the new Chief Executive, gives an interview to The Independent. He makes it clear that he does not think contracts with Japan can be regained quickly or easily and until they are he cannot open the new Sellafield Mox Plant. He emphasises how seriously BNFL is taking the need to restructure and improve safety. This was followed on 23 April with reports of a uranium fuel rod being found in a scrap yard.

*Note: This juxtaposition of very serious claims for every effort towards safety with further evidence of gross laxness in control was emphasised by the media.*

10 May 2000: US government pulls out of BNFL £4.5 bn contract for vitrification of radioactive waste, saying it had serious concerns about the management approach taken by BNFL.

*Note: This occurs after the management shake out.*

23 May 2000: Suggestions that British Energy wishes to withdraw from its contract for reprocessing spent nuclear fuel at THORP (Thermal Oxide Reprocessing Plant) at Sellafield and instead use dry storage. The future of THORP, which opened only 6 years before, is deemed to be threatened.

26 May 2000: Trade and Industry Select Committee supports decision to rule out part privatisation until late 2002. Chairman of the Committee attacks BNFL for "obscurantism and arrogance" and accused the government of failing to take control.

28 May 2000: The Times reported BNFL had £9 billion in previously undiscovered liabilities associated with the required eventual decontamination of the Sellafield site. 29 May: BNFL explained that the clean-up cost for the whole Sellafield operation would be spread over many years and does not immediately threaten the company financially - "to say the company is facing bankruptcy is nonsense...Any figures are a calculation of what something is going to cost as long as 150 years away". The Times claims that nevertheless this makes privatisation less likely.

*Note: From an amplification of risk viewpoint, the fact that BNFL is admitting that there will be no clean up for many years is a major factor. Also, every time financial matters are reported, newspapers present the potted history of the recent safety breaches and international calls for closure.*
2 June 2000: BNFL fined for allowing 1500 gallons of pressurised nitric acid to escape from a valve. BNFL spokesman said the company regretted the incident and added: "BNFL has already started strengthening the safety organisation at Sellafield". The Daily Mail reported that BNFL had said that the safety systems in place "prevented any acid escaping into the environment".

15 June 2000: German government agrees to phase out nuclear power there over the next 20 years. Reprocessing abroad to be banned from July 2005. This is reported to have severe economic consequences for Sellafield.

22 June 2000: The Independent reports that BNFL will still be breaking discharge regulations into the Irish Sea in 20 years from now, according to the government's strategy for radioactive discharges for the years 2001-2020.

23 June 2000: The Independent challenges the future economic viability of Sellafield, summarising again the Mox incident and claiming mox production cannot be cost-effective.

29 June 2000: 12 European neighbours at OSPAR convention tell UK and France to end reprocessing. UK asserts that it is not legally bound by the decision of the convention. BNFL is reported to be dismissive of the demand.

8 July 2000: BNFL allowed to bring a shipment of the mox fuel subject to falsified records back to the UK from Japan - within the next 2-3 years - subject to agreement of the countries it will need to pass in transit. £40 million compensation to be paid to Japan. Kansai Electric Company lifts its suspension on business with BNFL, opening the door to business worth £4 bn. In negotiating this lifting of the moratorium, the UK government and BNFL opened the way for regaining the main customer that they had foreseen for the still to be opened Sellafield Mox Plant.

*Note: This commercial success was greeted by environmental campaigners with concern: eight mox fuel assemblies, each with potential risks, were being returned to the UK rather than staying in Japan. The Independent noted that Sellafield when it was called Windscale was known as the world's nuclear dustbin and quipped "the tag is as applicable as it has ever been". The Times emphasises the risks of hijacking when the shipment is returned. The Guardian says: "Lugging its corrupt merchandise home can only be a publicity disaster for BNFL." The Mirror, under a headline "60 Atomic Bombs on Irish Sea Death Ship", claimed that the shipment would threaten Ireland with enough*
plutonium to make 60 atomic bombs as it passed its coastline. All the media mentioned that the compensation would ultimately be paid by the UK taxpayer. Hence the commercial success was characterised as a national failure (the UK gets the loss of face, the cost of compensation, and the risk of the returning fuel).

14 July 2000: The Guardian reports that a gun has been smuggled into Sellafield and shots fired. It turns out to have been a plastic gun using plastic bullets taken into the site for repair by one of the shift workers.

Note: Such an incident would hardly be expected to find a place in a national newspaper if it was not seen to be part of a hazard sequence. This illustrates that once a hazard sequence is established, there is a tendency to treat incidents as if they are hazards and merit notification that would otherwise go unnoticed.

Mid-July 2000: Daily Telegraph and Mirror carry remarkably similar pieces on Askew. He has given interviews which are designed to give his background and personality a high profile. The Chief Executive of BNFL gives himself a face for the public. Interestingly, The Daily Telegraph reports him to have said "the only reason I am talking to you is to get the message across that we are changing things".

30 July 2000: HSE decide to prosecute BNFL for failing to improve the safety of equipment used to gauge radioactivity.

THE NII INVESTIGATION AND REPORT

A team site inspection was carried out at Sellafield between 6-27 Sept 1999 at the request of the Chief Inspector of Nuclear Installations (Laurence Williams). It should be noted that the start of this inspection preceded the media reports of data falsification and BNFL reporting that its own Quality Control group had identified a problem. This site inspection had been prompted by "an apparent increase in the number of incidents occurring at Sellafield" and that NII examination of these incidents had indicated inadequacies in BNFL’s arrangement for control and supervision of operations. They had been looking, among other things, at the use of contractors on site and progress in reducing quantities of liquid high level waste stored at Sellafield.
Once the Mox incident was reported, BNFL voluntarily closed the facility and the NII instigated an investigation.

According to the statement from Laurence Williams, the NII investigation showed "that there had been a deterioration in safety performance at Sellafield". He commented "Sellafield is not unsafe, but strong management action is needed to ensure that it both remains safe into the future and that BNFL makes the practicable improvements which can reasonably be expected". There was no proper safety culture within the plant. As far the Mox fuel was concerned, the NII indicated that the extensive checks performed at all stages of production - before and after the stage where some falsification occurred - meant that the fuel should be safe.

The NII required BNFL to respond with a plan for improvement within 2 months and progress in enacting the plan was to be monitored as part of the normal process of NII regulation. The press release from the report finishes "Should progress be inadequate, NII will not hesitate to use its enforcement powers."

NII made 43 recommendations for improvement at Sellafield as a result of their inspection and investigation. Askew, the new Chief Executive, affirmed that BNFL would satisfy them all. By September 2000, 18 of 47 the internal milestones designed to meet these NII demands for improvements had been achieved (according to BNFL's Annual Report). Much of the BNFL response rests upon restructuring of business groups (now 4, led by General Managers, abandoning the matrix management that existed previously).

The Mox Demonstration Facility had been voluntarily shut down as soon as the incident was notified. At the time of writing this report, the facility is still closed. Williams stated in February it would not "be allowed to restart until we are satisfied that the recommendations in our report have been implemented".

This NII report appeared on 18th February 2000 and made available on the Web. It is evident from the account above that parts of the report had emerged publicly at various stages in the unfurling of the incident. Most notably, it emerged publicly rather late that NII had warned the Japanese of the possible problem with two of the assemblies that arrived there. It was crucial in proving BNFL untrustworthy in the eyes of the Japanese.
The NII report on the Mox Demonstration Facility made 15 recommendations for change. The BNFL Chief Executive on 2 October 2000 said the company had implemented five in full and had made progress towards completing the remainder.

KEY POINTS CONCERNING RISK AMPLIFICATION PROCESSES

This case study points to a number of developments or confirmations in our understanding of amplification processes:

• The Mox case study suggests that SARF has underestimated the potential for intensification to happen without mediation through a primary impact on local public concern. The Mox incident effectively aroused minimal public concern. It had what SARF would label secondary impacts (on political and commercial affairs) without significantly changing public concern. This suggests that SARF might need to revise the central part it allocates to media impacts upon public concern as the inevitable driver for intensification.

• The importance of hazard sequences is emphasised in this case study. However, in it, we see the way these hazards may be of completely different types (the technical, the commercial, the political) but work together to intensify the risk associated with any one. It is also evident in this case study that media coverage incorporates portrayal of the hazard sequence. Whenever one hazard is described, the other string of hazards associated with BNFL is rehearsed in brief, thereby refreshing the overall image of BNFL riskiness. This can be seen as another version of the media template for hazard stories.

• The pressure groups behave in this case study in exactly the way they would be advised to behave in order to optimize their impact. Their messages are simple, categorical, direct and repeated at all opportunities. They never engage with the details of the incident. They paint the bigger blacker picture and propose the total solution - cease reprocessing, close BNFL.

• The most important critical point in the Mox incident concerned the revelation that BNFL had failed to tell the Japanese the full story of the suspect fuel had been dispatched to them. Once this was public the Japanese lost face, BNFL were branded untrustworthy, and what had appeared an error that had been contained
was clearly uncontrolled. Interestingly, BNFL presumably could have anticipated this critical point. It could have recalled the shipment en route to Japan. It could have gained credibility by pro-activity. It did not take these steps. This whole episode gives rise to questions about the real visibility of critical points to those who are involved in any such incident. We argue elsewhere in this report that critical points may not be evident except in retrospect. In this case, it seems unbelievable that BNFL would not anticipate the grave importance that this revelation would have when it was ultimately made - as it would have to be, given NII's involvement.

- This case study signals the importance of cultural and socio-political context for intensification processes. It is noted above that the Tokaimura accident readied the Japanese public for outrage when faced with another potential nuclear problem. This outrage in the public was mirrored in the Japanese MITI and in the companies involved by a feeling that they had been duped and made to appear gullible. This was an explosive combination, requiring dramatic action on the part of the Japanese government on the international scene.

- It is notable that none of the players in the incident acknowledged any uncertainty about the safety of the fuel. All statements categorically asserted the safety of the fuel (even the "suspect" fuel). This juxtaposition of clear statements that safety control systems were being circumvented but safety was assured caused considerable confusion in the media reports and in public reception of their messages (evidenced by letters to newspapers at the time). People wanted to know how they could be sure the fuel was safe when the safety checks had not been made. This key point was addressed by BNFL repeatedly in press releases but not in a way understood by the media or the public. Essentially, the public could not understand why a procedure to assess the safety of the fuel was formally required, if, without it, the safety of the fuel could be assured. It could be argued that this was the critical ingredient in the initial intensification. It suggests that any company (or government organisation) dealing with a hazard notification needs to spend considerable effort on the analysis of the potential core confusions that the hazard will create for the non-specialist audience. It is these confusions that the initial prime messages must eliminate if intensification is to be curtailed.

- There is no question, in the light of the pattern of media coverage, that BNFL during this period were subject to substantial critical comment from one newspaper and one
journalist in particular. This illustrates the comments made in the media interviews that a single journalist can launch a campaign that will support (if not create) intensification.

- Finally, there is also no question that BNFL tried to correct the impression that the print media were creating about the seriousness of the incident. Interestingly, the broadcast media provided them with the best opportunity to do this. Where live interviews were broadcast, their message could not be censored. The use of live broadcast interviews in the context of an intensification episode needs to be further examined.

KEY POINTS OF PRACTICAL IMPORTANCE TO THE REGULATOR IN MANAGING SUCH A HAZARD NOTIFICATION AND ITS AFTERMATH IN THE CONTEXT OF AMPLIFICATION

In many ways the NII can be seen to have acted effectively in dealing with the Mox incident:

- A major site team inspection was already underway when the initial public announcement that there had been some data falsification occurred. The NII took action, and was seen to be taking action, immediately - to have been involved in the team site inspection at the time that the MDF investigation became necessary may have been a fortunate co-incidence but was nevertheless a major advantage. Rapid, visible, substantial action by the regulator may not prevent intensification of the risk associated with a hazard but it is likely to prevent the regulator being held as responsible in some indirect way for the original problem.

- The Mox Demonstrator Facility was closed immediately - even though this was done by BNFL voluntarily, NII made it clear that it would not re-open until the inspectorate was satisfied that all necessary measures had been taken to eradicate the sources of the original problem.

- The NII issued clear, concise and comprehensible statements concerning its analysis of (i) what had occurred in MDF and why; (ii) whether the fuel involved would be safe in use; and, (iii) what needed to be done to prevent recurrence.
• The NII statements allowed for no confusion concerning the origins of responsibility for the errors (i.e. BNFL management) and emphasised that NII was not in the business of minimising the significance of those errors. It could be seen to be taking a strong independent regulatory role and purely serving the interests of the public. It could certainly not be seen to be acting for the nuclear industry. In doing this, it secured its position for the future and would be more likely to be able to make publicly credible claims that the hazard had been controlled - once the problems are resolved.

In some ways the stance taken by NII might be seen to heighten the intensification of the risk attached to the hazard:

• While NII made it publicly clear that they did not regard the fuel to be unsafe, it did not engage in any significantly attempt to reassert this when the media produced accounts that confused unsatisfactory quality assurance procedures with unsafe products. It could be argued that this is not the role of NII. The point remains that the efforts that BNFL made to clarify this distinction were largely ignored since the company was discredited. NII was probably the only institution that could have authoritatively explained the distinction in the early weeks of the incident. Of course, the fact that it did not do so reinforced its independence from the interests of BNFL and served one of its probable objectives. The confusion which consequently remained undoubtedly encouraged intensification.

• In the context of the enormous amount of work it was doing behind the scenes, the NII remained remarkably invisible in the media during the whole period (apart from at the initial disclosure and on publication of its report). This selective presence undoubtedly added weight to statements when they did appear. It did, however, tend to leave BNFL alone to handle the media thirst for information. No brake was put on intensification processes as it might have been if the regulator had been seen to be providing firm information throughout.

• The manner in which the Japanese MITI was informed on the existence of suspect fuel assemblies in the shipment already dispatched was almost certain to initiate intensification processes internationally. The NII was reported to have stated that it had no obligation to publish its findings concerning these assemblies because: "The
only people who might have been (endangered) were Japanese and they were outside our jurisdiction”. This was hardly likely to assuage anger in Japan or reassure other international commercial markets. The whole handling of this part of the problem was central to major socio-political impact of the Mox incident. NII did exactly what it was required to do in national and international law - keeping MITI informed throughout. There is, however, in the press coverage clear signs that in this it was not forceful enough and did not ensure that BNFL made a clean breast of it to the Japanese. The accusations of collusion with BNFL that NII sought to avoid throughout could have developed from this. In fact, they did not do so, probably because the rest of the NII action was so clearly designed to ensure the safe operation of the facility.

CONCLUDING REMARK

The analysis of this case study used models of the processes intensification generated in the other case studies and derived from the media interviews conducted. However, this case has given rise to further development of these models. The case illustrates that the concepts developed are useful in understanding and predicting processes of intensification. However, it should be noted that this case study has been curtailed by the need to produce this report and the completion of the funded project. In fact, the story of the impact of the Mox incident goes on. The governmental review of BNFL for partial privatisation is due to restart soon. The analysis of the ramifications of the Mox incident should actually continue and be allowed to inform the activities of the regulator during that review period.