Dealing with differences of expert opinion

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Dealing with differences of expert opinion

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People who have to make important decisions often rely on others for specialist advice on topics where they themselves are not experts. Those decisions become much harder when differences of opinion arise about the specialist issues or their significance for the decision. Such differences might be among the experts themselves, or between the decision maker and the experts, or between the decision maker and other parties interested in the decision.

This is the report of a "quick look" research project to explore practice and expectations in dealing with differences of expert opinion, carried out during November and December 2001. The report covers

- How the research was carried out and with whom
- The research findings, and
- Conclusions on what constitutes "good practice" in dealing with such differences.

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EXECUTIVE SUMMARY

This is the report of a project carried out during November and December of 2001 to explore how different organisations deal with differences of specialist opinion, and identify any areas of generally agreed good practice. The research was carried out, and the report has been prepared, on behalf of the Health and Safety Executive by Tony Taig, of TTAC Limited.

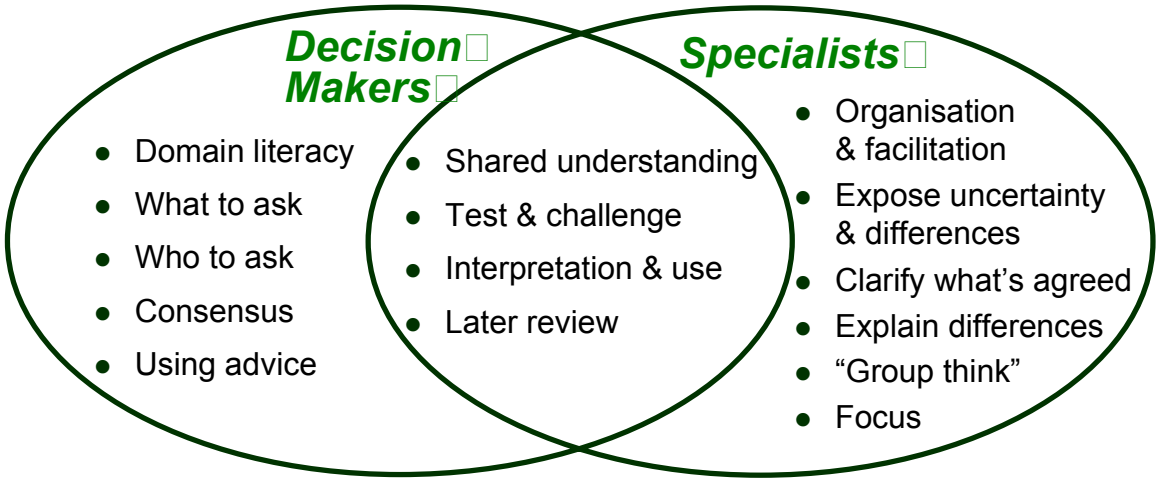
The research involved interviews with people in different walks of life, which were subsequently written up into case studies by the author and agreed with the respondents, who were

Participant	**Organisation**
Alan Osborne	BAA PLC
Vivienne Nathanson	British Medical Association
Mike Bell & Ian McLaren	Civil Aviation Authority
Jim Barron & Fred Jaeger	Office of the Civil Service Commissioners
David Fisk	DTLR
Jon Bell & Andrew Wadge	Food Standards Agency
Paul Davies & Mike Fountain	HSE
Sue Doran	Institution of Structural Engineers
Rupert Lywood	Matrix Securities Limited
Judy Britton & David Coles	Office of Science & Technology
Valerie Ellis	Prospect (formerly IPMS) Trade Union

While the scope of activities and decisions covered was very wide, some strong general themes emerged which, with qualifications as to their adaptation for circumstances, do provide, in the author's view, a reasonable basis for a definition of good practice in this area.

Good practice is collected and summarised in the form of the behaviour that should be expected of decisions makers reliant on specialists for advice, of the specialists themselves, and of both parties working together in the interests of the best decisions based on the best advice. The issues to be addressed, which are presently loosely in the order in which they would arise in a typical situation, are summarised in the figure overleaf, followed by a table containing a suggested good practice guide.

Dealing with Differences of Specialist Opinion: Suggestions for Good Practice – Page 1 of 2



Expect decision makers who seek specialist advice from others should be expected:

- if they do not understand the specialist topic area (e.g. law, science, engineering) to consult a trusted colleague or friend who does before defining what advice they seek and from whom
- to consider, when framing requests for advice, which matters are issues of
  a) specialist fact, solely the province of the specialist
  b) value judgement, solely the province of the people accountable for the decision, and
  c) inherently a mix of the two, on which the responsible decision maker may need to interact and discuss the advice and/or the decision with specialists.
- to consider, when deciding whom to ask for advice
  a) whether the extent of uncertainty and criticality of the issue involved warrant asking an individual opinion, or an opinion from more than one person
  b) if asking advice from a group, to select people with the aim of securing the appropriate mix of independence, technical expertise, respect for different potential viewpoints, and understanding of the decision context.
- to encourage, promote and facilitate the development of a consensus view on specialist matters, but not to insist on a false consensus being formed which suppresses important uncertainties or differences of opinion
- to give proper regard to any specialist advice they receive,
  a) seeking assistance from trusted friends or colleagues if they need help in interpreting the advice
  b) giving it appropriate weight alongside other factors in arriving at a decision, and
  c) explaining why they have acted either with, or against, the advice received.

Dealing with Differences of Specialist Opinion: Suggestions for Good Practice – Page 2 of 2

Those providing specialist advice should be expected:

- to brief themselves or their group properly, to ensure they have access to all the relevant facts and evidence, and where appropriate to seek appropriate support and facilitation in convening, and developing opinions, from groups of people
- to expose potentially important uncertainties and differences of opinion and advise of their potential importance for the decision at the earliest possible opportunity
- to talk, ideally face to face, with people who do not share their opinion, and clarify areas of agreement and residual differences
- to provide explanation and justification of their opinions, and to be prepared to discuss them with, and expose them to test and challenge from, colleagues and others
- to recognise and manage, if working in a group, the risks of capture of the group by particular interests or enthusiasms, and
- to focus on what matters most for the decisions they are informing, giving this priority over what is most technically challenging or interesting.

Advisers and those they advise should be expected to co-operate closely in:

- developing and sharing among all concerned a firm and clear understanding of the specialist advice sought, its context in relation to the decisions to be made, and the criteria to be applied in making any value judgements or assessments of significance
- testing and, if appropriate, challenging advice in proportion to its significance to the decisions to be made, in a non-confrontational way and in a spirit of co-operation towards arriving at the best decisions
- communicating effectively with each other, to interpret and apply the advice. If this is difficult, an interpreter (typically someone who understands both the decision context and sufficient of the specialist domain to appreciate the arguments) should be used.
- establishing the need for and basis of subsequent review; both parties should
  a) identify what new information or other factors would lead specialists to changing their advice, or to decision makers changing their decision,
  b) agree on this basis when and how the decision, and any specialist advice on which it relies, should be reviewed later when better information is available, and
  c) agree how best that information should be developed.

CONTENTS

Introduction

People who have to make important decisions often rely on others for specialist advice on topics where they themselves are not experts. Those decisions become much harder when differences of opinion arise about the specialist issues or their significance for the decision. Such differences might be among the experts themselves, or between the decision maker and the experts, or between the decision maker and other parties interested in the decision.

This is the report of a "quick look" research project to explore practice and expectations in dealing with differences of expert opinion, carried out during November and December 2001. It has been prepared for the Health and Safety Executive by Tony Taig of TTAC Limited. The report covers

- How the research was carried out and with whom
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- Conclusions on what constitutes "good practice" in dealing with such differences.

The Research Approach

The aim of this research is to explore practice and expectations in dealing with differences of expert opinion. The objectives are to inform and assist HSE's own development of practice in this area, and to promote the exchange and discussion of ideas and practice with others. As a regulator, HSE is particularly involved in three types of activity:

- policy – for example, advising the Health and Safety Commission (HSC) on what sort of regulations should be enacted, or deciding what standards should be reached to demonstrate compliance
- permissioning – granting permission for operators of potentially hazardous activities such as railways, nuclear plants, offshore platforms and major hazard chemical plants, subject to satisfactory submissions from the operator
- operations – inspection of premises and enforcement of the law.

The research therefore focused on these three types of activity in particular, and their analogues in other organisations.

The research was carried out through personal interviews and discussions during November and December 2001. Interviews were arranged with people from HSE and from a number of organisations in both public and private sectors that the author, after consultation with HSE, considered might have interesting and relevant experience. Some were regulatory organisations dealing with issues closely paralleling HSE's own roles; others were in quite different walks of life. A summary of the respondents and their organisations is given in Table 2 below.

Table 2: Participants in the Research

Participant	Organisation	Position/Role
Alan Osborne	BAA PLC	Director of Risk and Safety Management
Vivienne Nathanson	British Medical Association	BMA Director responsible for professional leadership
Mike Bell & Ian McLaren	Civil Aviation Authority	Director & Surveyor, Operations & Standards Division
Jim Barron & Fred Jaeger	Office of the Civil Service Commissioners	Secretary to the CSC, and Recruitment Regulations & Appeals Adviser
David Fisk	DTLR	Chief Scientist
Jon Bell & Andrew Wadge	Food Standards Agency	Deputy CEO/Chief Scientist (JB), and
Paul Davies & Mike Fountain	HSE	Director HID & Chief Scientist, and Head, Technology Division

Sue Doran	Institute of Structural Engineers	Director, Technical Activities
Rupert Lywood	Matrix Securities Limited	Managing Director and Principal Shareholder
Judy Britton & David Coles	Office of Science & Technology	Director & Deputy Director, Science in Government
Valerie Ellis	Prospect (formerly IPMS) Trade Union	Assistant General Secretary

The participants in many cases spoke from personal experience going beyond their present organisation or role, and in all cases spoke freely about issues which had at some stage caused considerable difficulty for themselves and their colleagues.

Each interview/discussion was written up by the author into a short "case study" paper (these include a mixture of specific case anecdotes and notes of discussions relevant to the topic), describing in most cases

- the organisation and the role of the participating individual(s),
- typical decisions involving reliance on specialist advice
- the sorts of issues that arise and how they are handled, and
- a summary of the main points relevant to dealing with differences of expert opinion.

The individual case studies have been reviewed and approved by the participants in question, recognising that they contain a mix of observations and comments attributable to the respondent and observations and inferences drawn by the author. The observations and discussion in the main body of the report are entirely those of the author and should not be taken as implying any endorsement from any other party.

The author is extremely grateful to all of the respondents for their participation, and in particular for their willingness to discuss and share painful as well as successful experiences.

The case studies in their entirety are presented as Appendix 1. A brief description of each, and discussion of the findings and conclusions, is provided in the following sections.

The Case Studies

This section provides a very brief overview of each of the case studies, which are presented in full in Appendix 1. While each of the case studies has been checked and authorised by the relevant respondents, these overviews include observations made by the author. They thus do not necessarily represent the views of the case study respondents themselves.

1. BAA PLC: BAA is the privatised airports operator, with major interests in retailing and overseas airports as well as in their core economically regulated UK airport business, which includes London Heathrow and Gatwick airports. The case study explored decision making on risk issues by the Group Board in particular. Great strides had been made in recent years in the process by which expert advice on risk associated with major decisions was collected from many different experts, and presented to the Board to support important decisions. How to balance safety and security against other corporate values remains a difficult issue. Important elements of the BAA approach for dealing with differences of expert opinion include:

- Consistent application of an agreed process and risk framework, in which the roles of the decision makers and of the advisers are clear
- Face to face discussion among the various interested parties and specialists
- High quality preparation and facilitation of such sessions.

2. British Medical Association: The BMA is the professional organisation and Trades Union for the medical profession, and gets involved in a wide variety of policy and advisory roles. The case study explores medical analogues of HSE's core policy, permissioning and operational activities, and provides a very clear statement of expectations BMA would have of organisations and of professional staff in dealing with differences of opinion. Important general aspects of dealing with conflicts of judgement include

- Exposing uncertainty and differences of opinion
- Face to face discussion to resolve differences
- Care and competence in adapting specialist advice for non-specialist decision makers
- Changing behaviour, not just identifying problems and solutions, and
- Monitoring decision outcomes, and being ready to review and revise decisions as more information becomes available.

3. Civil Aviation Authority: The CAA is the UK's aviation safety and economic regulator. The case study focuses on the activities of CAA's Safety Regulation Group in relation to assuring the airworthiness of aircraft. Examples discussed include certification of a new aircraft (the Airbus 380), dealing with modifications to existing aircraft, and the re-certification of Concorde following the Paris accident in June 2000. Important points noted include

- Substantial formal and informal effort to build a shared understanding of principles and requirements applicable to aircraft certification among staff

- Face to face meetings to expose and agree a position on key issues for important decisions
- A strong governance framework, with an independent Board overseeing all the work
- Acting on a precautionary basis in the face of important differences of view, and revisiting decisions later when issues can be better resolved.

4. Office of the Civil Service Commissioners: The Civil Service Commissioners exist to maintain selection on merit in recruitment into senior Civil Service positions, and to hear and determine appeals by Civil Servants under the Civil Service Code, which dates in its present form from 1996. The officials interviewed had been involved in an appeal to the Commissioners by a member of HSE's Offshore Safety Directorate in 1999. The body of appeals experience is, though, as yet very small (about one appeal has been heard each year since the introduction of the Code), so provides little guidance as to good practice in dealing with differences of professional opinion. A number of pointers to such practice were identified in discussion of the Code and the general experience of the Office of the Commissioners in dealing with Civil Service personnel issues. In particular, the author noted the desirability of having suitably qualified assistance accessible to senior generalist managers who call for and use the advice of specialists.

5. Department of Transport, Local Government & the Regions: Most of the activities for which DTLR is responsible are managed by local government or Agencies of central government. This case study ranges across a wide variety of issues and experiences of the Department's Chief Scientist, in this and previous jobs. Examples discussed include climate change, transport planning and various mechanisms for resolving differences between experts. Key points include:

- There is much to be learnt from the criminal and civil justice system on this topic, particularly from Lord Woolf's review of Access to Justice
- Timing is very important; when decisions have to be made in the face of uncertainty and different expert views, the advice needs updating and decisions revisiting later.
- Disciplinary presumption is a significant hazard of which to beware.
- The best method for resolving differences of expert opinion will depend on the factors such as the context of the decision, the nature of the expert evidence, and the time available.

6. Food Standards Agency: The FSA was established in April 2000 to protect the public's health and consumers' interests in relation to food. The case study explores dealing with uncertainty, working with expert committees, communication of advice, and the importance of making expert advice practical and useable. The main points raised, covering the whole range of issues in dealing with differences of expert views, were

- Significant differences of opinion should be exposed wherever they are material to decisions
- Much can be learnt from government experience in other areas to help avoid the risks associated with developing expert advice through expert committees
- The role of in-house technical staff is critical, in framing questions for committees, and in testing, challenging (if appropriate) and helping interpret and apply their advice

- Policy making should be made with uncertainties and unresolvable differences of view out on the table, not suppressed.

7. Health and Safety Executive: HSE is the executive body of the UK's unitary workplace health and safety regulator, the Health & Safety Commission, and was the sponsor of this research. The case study covers HSE's main roles of developing policy advice, permissioning the operation of potentially hazardous activities such as railways, nuclear plants and offshore installations, and field operations (inspection and enforcement of the law at workplaces throughout the country). At the heart of the law which HSE applies is the duty of employers and others to ensure that they control risks to a level "as low as reasonably practicable" (ALARP). What constitutes ALARP is inherently a matter of judgement. HSE is a heavy user of specialist legal, technical and industry-specific advice to help interpret what is ALARP, and to prove or disprove breaches of the law. Lessons on dealing with differences of expert opinion include

- exposing potential differences is a vital first step – difficulties sometimes arise because relevant special expertise is only brought to bear too late in the day
- it is important to distinguish between purely technical issues (e.g. "How big is this risk?", and issues or judgements which involve a balance of technical and value judgements (e.g. "Has everything reasonably practicable been done to assure safety?"). The latter are more of an issue than the former in HSE.
- informal networking and behaviour, and good processes and procedures, are both important for dealing with differences of expert opinion

8. Dynamic Loads on Stadia: This case study covers the experience of the Institution of Structural Engineers in bringing together and managing committees to develop new guidance on the assessment of dynamic loads at sports stadia. The examples covered are a 1990's review of demountable structures, and a very recent 2001 example study on football stadia. The main points learnt in the course of the first exercise and applied in the second were

- Getting the committee composition right – it was important for this purpose to have a good representation of opposing views
- Quality of leadership and support from professionals who understood the technical issues (though not experts on the specifics) is vital
- People and relationship issues are just as, if not more, important in building a consensus about what to do in the face of differences of view
- Making advice and recommendations practicable and workable matters very much.

9. Matrix Securities Limited: Matrix is an investment management company that specialises in developing innovative investment products. The case study concentrates on two examples, one a property investment scheme relying for its attractiveness on the tax status conferred on the investment, the other a scheme which used expensive insurance to de-risk otherwise high risk investment in films. In both cases, commitments originally entered into by the Inland Revenue in the first case, and the insurers in the second, were later overturned. The disputes were/are being settled in court. The main observations were

- Decisions based on the best expert advice and a consensus from key stakeholders can be overturned quite quickly as circumstances change
- Matrix (the client for advice) has to maintain a firm grip on the strategy and policy issues surrounding the use of expert advice
- When differences arise, an impartial second opinion can be more helpful than one of the original proponents in sorting them out
- Decisions are made by people, who always weigh many other "soft" factors alongside expert advice, even if the specialist issues are central to the decision.

10. Office of Science & Technology: OST provides the overall coordination, leadership and funding of research carried out through the Research Councils, and is headed by the Government's Chief Scientific Adviser. This case study covered the guidance on the use of scientific advice in public policy developed by OST, which was published in June 2000, and the more recently published code of practice for scientific advisory committees. Key themes running through OST advice to other government departments include;

- exposing and considering alternative opinions on important issues
- openness about uncertainty
- ensuring quality in-house expertise is available to help manage the interface with the scientific community and expert committees in particular
- delineation of the boundaries between expert advice, and the making of policy decisions which combine scientific advice and other issues and values.

11. Prospect: Prospect is a 140,000 member trade union which incorporates the former Institute of Professionals, Managers and Specialists (IPMS) – the trade union for many scientific and technical staff in government and public services. The case study focuses on IPMS' involvement in the debate generated by the BSE Inquiry, where many of their members were involved and had their work, decisions and advice exposed to scrutiny. IPMS convened a conference to discuss the issues encountered at the interface between science and public policy. Many of the issues identified have been raised in others of the case studies above (the respondent in case study 6 took part). Particular issues for specialist staff highlighted in this case study included:

- concerns over the reductions in numbers of in-house technical staff and potential conflict of interests they see as being associated with the commercialisation of government science
- concern about possible victimisation of members who challenge established views
- the importance of specialist staff working closely with decision makers – responsibility for decisions should be clear, but where important decisions depend critically on specialist inputs, the specialists should work closely with the decision makers.

Discussion and Conclusions

The case studies provided indications both

a) as to the expectations it is reasonable to have of organisations, and

b) of what people and organisations have learnt by experience worked better,

in dealing with differences of professional opinion. Table 3 shows which case studies provided suggestions for expectations, and which for practice (in respect of each of the three HSE core activities of policy, permissioning and operations).

Table 3: Case Study Linkage to Expectations & Approaches

Case Study	**Particular relevance to ……**			
	Expect-ations	Policy	Permiss-ioning	Opera-tions
1. BAA PLC		●	●	●
2. British Medical Association	●	●	●	●
3. Civil Aviation Authority		●	●	
4. Office of the Civil Service Commissioners	●			
5. Department of Transport, Local Government & the Regions	●	●		
6. Food Standards Agency	●	●		●
7. HSE		●	●	●
8. Institute of Structural Engineers		●		
9. Matrix Securities Limited			●	●
10. Office of Science & Technology	●			
11. Prospect	●			

Some consistent themes emerged, which are collected below under the headings of Expectations, Practice (Framing the Questions, Developing Expert Advice, Using Expert Advice, and Reviewing), and General Observations. Case Studies where themes were raised or developed are referenced by the numbers 1-11 as in Table 3.

There is no objective basis of evaluation underpinning the selection of these points as representing "good" or "best" practice. In the author's view they do, collectively, represent a reasonable benchmark for good practice, in that they represent points of fairly solid agreement across all of the respondents in the case studies (with the proviso of the "horses for courses" factors discussed under General Observations).

EXPECTATIONS

Much of what people feel constitutes good practice in this area is embodied in the types of behaviour people would want to see decision makers and their specialist advisers exhibit. A summary of reasonable "good practice" expectations is provided in Table 4 below.

Table 4: Reasonable "Good Practice" Expectations

1. Of Managers and Decision Makers:

It is reasonable to expect that decision makers who rely on others for specialist advice should:

- brief specialists clearly on the advice they seek, its context in the decision to be made, and what they most want to know in the event of uncertainty or differences of expert opinion
- encourage specialists to expose their ideas to peer scrutiny, and to talk to people who disagree with them to clarify areas of agreement and of residual disagreement
- provide support and facilitation, if needed, to promote development of a consensus view among people with different opinions, but not exert undue pressure to achieve consensus
- expect and demand openness about uncertainty
- test and challenge the advice offered to them, in proportion to its importance to the decision to be made
- explain their decisions, in particular if they appeared to go against the specialist advice offered
- use trusted friends or colleagues who are literate in the specialist domain involved to help them with all of the above, if they are not thus literate themselves.

2. Of Specialists Providing Advice

It is reasonable to expect that specialists providing advice to support decisions to be made by others should:

- ensure they are clear about what they have been asked for, and its context in relation to the decision to be made, before developing their opinions
- identify and consider potential uncertainties and differences of opinion, and inform the decision maker of any likely to prove significant as early as possible
- discuss significant differences with people who disagree with them and clarify the areas of agreement and disagreement as far as practicable
- be prepared to sit down with other people and have their views challenged and tested, without regarding this as an affront to their professional integrity
- be ready, willing, and able in a non-confrontational way to test and challenge the views of others
- be prepared to focus on what matters most to the decision, not what is most interesting to explore from their specialist perspective.

PRACTICE

This section identifies the main points and suggestions made in terms of what a decision maker and expert(s) ought actually to do to ensure they deal well with differences of opinion. These are summarised and combined with the expectations above into a "good practice" guide in the Conclusions section below. Please note that these are all generalisations; some important observations about their application are made in the "General Observations" at the end of this section.

Framing the Questions

This heading covers everything that a decision maker and their expert adviser(s) need to think about before the expert(s) start work to generate their advice. The general aims here are to ensure that differences of opinion are opened up to debate (in so far as they are material to the decision to be made), and that the experts know what is expected of them in terms of raising and dealing with differences.

The following points were the most consistently and powerfully advanced by respondents:

- Make sure the decision process, and the parts played in it by the specialist and the decision maker, are absolutely clear to all concerned (1,2,3,4,5 ,6,7,9,10,11)
- Choose experts with care. For well-established fields where there is likely to be little doubt or uncertainty a single opinion may suffice. If there is major uncertainty and there may be strong and important differences, make sure a diversity of viewpoints is represented. In such cases, include if possible one or more people from different disciplinary backgrounds to the subject at issue, to test & challenge "disciplinary presumptions" (2,5,6,8,9)
- Frame questions carefully so that they fall within the scope of the experts' competence to answer. Be careful to avoid questions that invite experts to make value judgements on issues outside their relevant expertise. For example, invite a toxicologist to comment on the relative toxicity of foodstuffs, but not on their relative health benefits, ease of production and overall value as foods. (1,2,4, 6,11)
- Help the experts to understand the context of their advice in relation to the decision to be made, so that they can judge when a difference of opinion is more or less significant. (2,4,5,6,7,8,10,11)
- If you (the decision maker) yourself are not comfortable with the specialist domain, get a trusted close friend or colleague who is to help you in framing the questions for and briefing the experts. (2,4,6,7,8,9,10,11)
- Make clear that uncertainty and differences of opinion should be opened up for debate, and that (as a decision maker) you want to make decisions in the light of such differences and uncertainties. Encourage a spirit of openness, and of looking for, testing and challenging alternative opinions. (1,2, 6,8,10)
- Make clear what, as a decision maker, you would most like to know if there are differences of opinion. For example, do you want "truth, with uncertainty minimised", or are you more interested in "building a consensus that will stand up to fierce scrutiny in the press/in court/among peers"? (2,,9)

Developing the Advice

This heading covers all that goes on in the course of experts working to develop their advice. Key points here were:

- Promote a climate in which people are encouraged to put forward controversial or alternative views, in the expectation that they will be vigorously tested and challenged, but treated with respect for doing so. (1,2,3,6,8,9,10,11)
- Make sure significant differences are identified and documented as the work develops, and that the pressure to reach a consensus does not overpower genuine differences and uncertainties relevant to the decision to be made. (1,2,4,6,7)
- Build a strong, shared understanding of the criteria and processes involved in the decisions to be made, so that advice can be framed to be of most help to the decision makers. (3,4,8)
- Promote resolution of differences through face to face meetings, not through barrages of e-mails and memoranda. (1,2,3,5,6,8)
- There are many well-known mechanisms by which groups can
  - overlook important differences of opinion
  – trample on minority or alternative views
  – persuade themselves, democratically or otherwise, to artificial certainty
  – be captured by particular interests or preconceptions.
  If you are involved in a group of experts, try to stand back and think about what are the risks of your group failing to manage differences well, and what you can do about them. (1,5,6,11)
- If you have a number of experts working in a group, then pay careful attention to its leadership and management. High quality facilitation and support are among the most important factors in getting the best results from a group and avoiding the main risks. (1,2,6,8)

Using Expert Advice

The case studies revealed several examples where, having received good quality specialist advice or opinion, sub-optimal decisions were reached because too little care and attention were given to what to do to incorporate that advice, along with other factors, into decisions. Key points here were:

- Put a lot of effort into marrying together advice on specialist topics, including that on uncertainties and differences of opinion, with all the other attributes important to the decision. If you (the decision maker) are not comfortable in the specialist field, get a close, trusted friend or colleague who is to help you. (2,4,6,7,8,9,10,11)
- Accept that there will be uncertainties and differences of opinion on specialist (including scientific) topics. Don't expect the specialist advice or information to make the decision for you. Rather than seeking certainty where it is not possible, look for decisions that will be robust and defensible in the face of uncertainty. (1,2,4,6,7)
- Don't presume that the expert who offers you advice with greatest certainty knows more than all the others; the best experts are realistic about uncertainties and don't understate them. (1,2,4,6,8,10)

- If you really can't decide whose opinion is right, adopt Lord Woolf's simple advice on cutting through differences of expert opinion that arise in an adversarial setting:
  - get the differing experts together in a non-threatening setting
  – get them to define the scope of areas on which they can agree
  – and thus narrow down and make specific the differences. (2,5)
- If you still can't decide, or are not sufficiently confident in an expert view to base a very important decision on it, then consider
  – getting a third party expert who has not been involved to give a 2nd opinion (2,3, ,5,9), or
  – getting a third party who is not an expert but is good at evaluating evidence to give an opinion, for example a QC, or a technical expert with a slightly different specialism who will understand the language and issues but bring fresh thinking to bear (2,5,7,8)

Reviewing Advice and Decisions

Many people have remarked in the course of this work on how infrequently organisations and individuals look back at decisions and their basis, and think seriously about how they might improve them. There were too few ideas and suggestions in this area to be able to suggest that any of the following points represent a consensus as to a preferred approach; they are offered here as ideas for consideration.

- Key decisions made or key pieces of specialist advice given in the face of significant differences of opinion should be revisited later. The timeframe for revisiting should be established at the time the decision is made in the light of the developments anticipated in knowledge, or of changes in values that might be foreseeable (3,5)
- Where decisions of a particular type are to be made regularly, it may be valuable to establish some form of governance over the consistency and quality of those decisions which extends beyond the direct management responsible (3,4,10)

GENERAL OBSERVATIONS

Looking across all of the case studies, there is a large amount of common ground in terms of the general principles and practices people feel should apply to dealing with conflicts of expert judgement. There are also some fairly obvious general differences of approach which are linked to the context of the issue in question. The most general such differences appear to be:

1. **Uncertainty & its Significance**: The significance (as opposed to the extent) of uncertainty or scope for difference among recognised experts is very important. If this is low, then mechanisms for procuring advice can be very simple; if high, then more effort needs to go into exposing and dealing with differences.

2. **Context of Issues**: Important contextual issues might relate to the decision to be made, or to the nature of the specialist issue and whether it is amenable to objective resolution (i.e. the extent to which an expert may be provable "right" or "wrong"). Table 5 below illustrates with some examples that would be familiar in a regulatory setting:

Table 5: Example Decision and Issue Contexts

DECISION CONTEXT	Specialist Issue Context
• risks are well understood, there is a high degree of consensus on appropriate controls, controls are well codified in standards or guides to good practice • new practices are emerging, standards are developing, the environment is changing to shift patterns of risk, different opinions are possible about how best to control risks • highly innovative technologies, uncertain risks, no established norms for risk control, high degree of difference of opinion as to how risks should be controlled	• pure science, where basic facts are in doubt (e.g. can people get BSE?) and are critical to a decision, through • many engineering and regulatory types of issue where there are choices of solution to a problem, no one is definitively "best", but a wrong choice could later be proven to be dangerously wrong (e.g. how should we assess the adequacy of sports stadia in responding to dynamic loads?), to • the purely social/consensual, where the only measure of right or wrong is what people are prepared to agree to (e.g. should an investment scheme be allowed a certain interpretation of tax rules?)

adapt and tailor approach

3. **Timing**: There is clearly a need to adapt the approach to the time available. If decisions have to be made quickly and uncertainties or differences of opinion cannot be resolved, the decision may have to be made on a precautionary basis (see for example the CAA or FSA case studies). As the urgency increases, so the value of good informal networks and the ability quickly to explore possible differences of view and reach a consensus increases.

4. **Formal versus Informal Mechanisms**: There is often a tendency, particularly in technical areas where issues are viewed as having an objective basis, to regard a formally arrived at decision as more secure than one informally established. The Matrix case study illustrates an extreme example of where this was not the case (the Inland Revenue reversing a decision originally put in writing), which is more generally interesting. If what really matters at the end of the day is what people will think about a decision, then formal process alone may not be sufficient. It often needs to be accompanied by measures that will build a consensus which stands up to the scrutiny of those who will examine it. In the regulatory context, it is one thing to have an excellent process for deciding what measures to take to control a particular risk on an objective basis. But if people don't like them and they are universally ignored, it may be very difficult to get a court to uphold a prosecution.

CONCLUSIONS

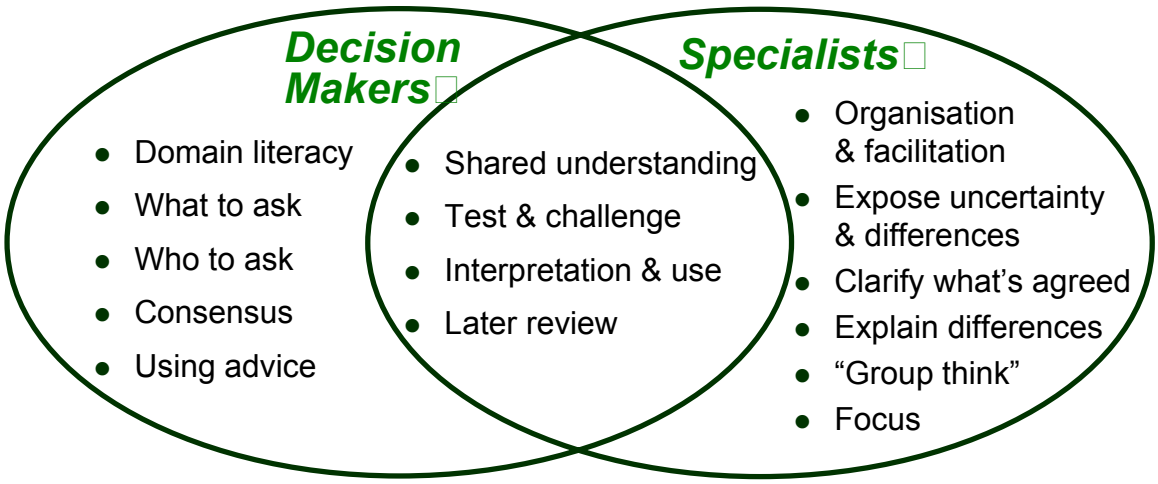
1. There is widespread recognition of the importance of managing disagreement among experts in many different walks of life. The issue is important in many different situations, including those where
   – technical uncertainty is critical to the decision
   – different value judgements critically affect the decision
   – the cost and effort of resolving differences hampers decision making
   – decisions that should be exposed to more serious scrutiny are not.

2. There is no objective basis on which to define what constitutes "best practice" in dealing with differences of specialist opinion. There is, though, a very good degree of consensus about what constitutes good, or preferred practice in the views of those who participated in this research.

3. The practice adopted in dealing with differences of opinion needs to adapt to the circumstances surrounding the decision to be made, in particular the time available and the context of both the specialist issues and the decision circumstances.

4. People, and informal as well as formal processes, are very important in dealing with differences of opinion. Reasonable expectations both of decision makers and of specialists advising them are summarised in Table 4 above.

5. Issues to be addressed by decision makers reliant on specialist advice, by the specialist advisers, and by the two working together in exposing and dealing with differences of expert opinion are summarised in the figure below.



6. Corresponding "good practice" guidance in respect of each of the points in the figure, synthesised from the information collected in this report, is summarised in Table 6 overleaf. The guidance is expressed in terms of behaviours that should be expected from both parties, rather than prescriptions for processes or procedures.

Table 6: Good Practice for Dealing with Differences of Expert Opinion

Expect decision makers who seek specialist advice from others should be expected:

- if they do not understand the specialist topic area (e.g. law, science, engineering) to consult a trusted colleague or friend who does before defining what advice they seek and from whom
- to consider, when framing requests for advice, which matters are issues of
  a) specialist fact, solely the province of the specialist
  b) value judgement, solely the province of the people accountable for the decision, and
  c) inherently a mix of the two, on which the responsible decision maker may need to interact and discuss the advice and/or the decision with specialists.
- to consider, when deciding whom to ask for advice
  a) whether the extent of uncertainty and criticality of the issue involved warrant asking an individual opinion, or an opinion from more than one person
  b) if asking advice from a group, to select people with the aim of securing the appropriate mix of independence, technical expertise, respect for different potential viewpoints, and understanding of the decision context.
- to encourage, promote and facilitate the development of a consensus view on specialist matters, but not to insist on a false consensus being formed which suppresses important uncertainties or differences of opinion
- to give proper regard to any specialist advice they receive,
  a) seeking assistance from trusted friends or colleagues if they need help in interpreting the advice
  b) giving it appropriate weight alongside other factors in arriving at a decision, and
  c) explaining why they have acted either with, or against, the advice received.

Those providing specialist advice should be expected:

- to brief themselves or their group properly, to ensure they have access to all the relevant facts and evidence, and where appropriate to seek appropriate support and facilitation in convening, and developing opinions, from groups of people
- to expose potentially important uncertainties and differences of opinion and advise of their potential importance for the decision at the earliest possible opportunity
- to talk, ideally face to face, with people who do not share their opinion, and clarify areas of agreement and residual differences
- to provide explanation and justification of their opinions, and to be prepared to discuss them with, and expose them to test and challenge from, colleagues and others
- to recognise and manage, if working in a group, the risks of capture of the group by particular interests or enthusiasms, and
- to focus on what matters most for the decisions they are informing, giving this priority over what is most technically challenging or interesting.

Advisers and those they advise should be expected to co-operate closely in:

- developing and sharing among all concerned a firm and clear understanding of the specialist advice sought, its context in relation to the decisions to be made, and the criteria to be applied in making any value judgements or assessments of significance

- testing and, if appropriate, challenging advice in proportion to its significance to the decisions to be made, in a non-confrontational way and in a spirit of co-operation towards arriving at the best decisions
- communicating effectively with each other, to interpret and apply the advice. If this is difficult, an interpreter (typically someone who understands both the decision context and sufficient of the specialist domain to appreciate the arguments) should be used.
- establishing the need for and basis of subsequent review; both parties should
  a) identify what new information or other factors would lead specialists to changing their advice, or to decision makers changing their decision,
  b) agree on this basis when and how the decision, and any specialist advice on which it relies, should be reviewed later when better information is available, and
  c) agree how best that information should be developed.

Appendix 1: Case Studies

CONTENTS

CASE STUDY – BAA PLC

The Organisation

BAA began life as the British Airports Authority, and was one of the earlier public service privatisations in the 1980's. BAA's core economically regulated business involves operating seven major airports in the UK, including London Heathrow and Gatwick. The airports operate as limited company subsidiaries of the Group. The company also has a variety of interests in overseas airports, and is a major UK retailer not only through shops at airports but also through a joint venture, McArthur Glen, which operates a number of shopping villages in the UK. The respondent for this study was Alan Osborne, Director of Risk and Safety Management.

Nature of Decisions

Alan's role brings together corporate governance as well as health, safety, security and environmental leadership, and involves policy development and compliance monitoring. He and his team are actively involved in the appraisal and decision support process for all major company decisions. His work thus involves a corporate (as opposed to regulatory) perspective on the main types of activity of interest to HSE:

- Policy & strategy: developing proposals to the Board, which itself determines company strategy and policies
- Acceptance of new proposals: leading and facilitating the company process for appraisal and evaluation of risks involved in new ventures and major decisions, and
- Testing of compliance: audit and monitoring on behalf of the Board.

The Decision Makers and the Experts

As in any company, the Board is the ultimate decision maker. A variety of experts in different parts of the company have diverse views on major decisions facing the company and the risks they involve. A typical decision will have input from:

- A project champion, typically someone from an operating business, who is a passionate advocate of the proposal and may (often supported by marketing or business development people) not want to hear about the risks
- Finance and tax specialists, who are particularly concerned about revenues, costs and cash flows
- Legal and public affairs people, who tend to share common concerns about company reputation and the creation of liabilities
- Alan and his team, who take an overview of risks involved, and also "own" the company process for bringing all these views together and presenting them to the Board.

One of the commonest tensions Alan faces is between his staff, who are broadly speaking "risk specialists", and others who have line responsibility for risk management yet often do not have the same perspective on or framing of risk issues as Alan's team.

Issues and Examples

One of the main issues that arises again and again at BAA, as in many other companies, is the question of the values to be attached to different aspects of risk when they are weighed together in decisions. In safety, a particular issue arises in interpreting what is "ALARP", and how far the company should go to live up to its stated policy of making safety and security firmly its top priority.

A good example of a major decision where this was the central issue related to the Central Terminal Area at Heathrow Airport. This is the area where large numbers of people congregate when arriving on or departing by the Heathrow Express, and are routed around the airport via a large network of tunnels and travelators. A number of company inspections and audits highlighted potential safety risks, and aspects of risk control that safety auditors and risk assessors considered did not represent modern good practice. The issues involved included escape routes, exits, compartmentalisation, wall materials, cabling and vinyl flooring – the overriding risk of concern was that of fire in an area from which rapid evacuation could be difficult in some circumstances.

Specialists from Alan's team worked with the Airport staff to assess the risk, and develop a number of options for dealing with the problems. These were discussed with the London Fire & Civil Defence Authority, and the BAA team adopted a proposed solution which they judged most effective in tackling the risks. There was an uneasy sense in doing this that the specialist team were applying value judgements (of the "how far is far enough", or "how much more should we spend to reduce risk by X" variety) which might not necessarily be shared by, and had not been explicitly endorsed by, the Board.

Because the proposals involved capital expenditure above £25million, they had to be presented to and sanctioned by the Group Board. Like most proposals not involving a direct commercial benefit, this case was subject to intense scrutiny and debate. The proposals were accepted, based on the subjective evaluation of the Board that they represented the best way forward, without any objective basis for weighing benefits and disbenefits to evaluate the best option.

Alan has tried throughout his 7 years at BAA to persuade the Board of the merits of adopting a more structured approach to such value judgements, making more explicit (without diving into a "decision by numbers" game) the company's values on issues such as safety, security and the environment. His previous experience at London Underground Limited, where he led the introduction of such a system, was that it had been tremendously helpful in dealing with complex, difficult and emotive issues in a broadly consistent framework. But his efforts in this regard at BAA have been resisted.

A major factor in the Board's sentiments on this issue was their perception of the railway's experience in this area. They saw the railways, led by Railtrack, as having made an honest attempt to develop and apply such a value system in order to make better decisions, achieve the best returns for a given investment in safety, and avoid wasting public money on ineffective schemes. Instead of being lauded for their bravery, the BAA Board saw the railways being pilloried and vilified for their efforts in this regard, and had no intention of allowing the company to suffer the same fate.

On a more positive note, Alan feels that great strides have been made during his time at BAA in the process by which different specialist views on risk are brought together in

support of major company decisions. The company has adopted a process applied to all major decisions brought to the Group Board whereby:

1. Project champions and company experts in all the different relevant fields are brought together for a workshop to build a consensus on the risks involved in the decision, their relative importance, and how they can be managed
2. A crude 5x5 matrix of severity x likelihood is used to represent the relative criticality of different risks; the Board endorsed the yardsticks used to measure equivalent "badness" in different terms such as money, safety and reputational damage
3. The output of this process is turned into a paper for submission to the Board, who will not make any major decision without such a paper, and have become used to using this framework as a basis for challenging and testing key aspects of decisions.

Making the time and space for face to face discussion to test and challenge each others' views is critical to the success of this process. Quality preparation and facilitation are also vital. Alan and his team bring together information, and often map out the broad and more obvious risk areas to save time and minimise the boredom factor, particularly when senior people are involved in the workshops, which is often the case. A recent example examined options for the future of McArthur Glen, the company's flagship retail venture, and involved both Finance and Retail Directors, people whose time is very valuable. Alan's staff are all trained in advanced facilitation skills. Their aim is to make every attendee feel that their opinion is valued – which can be difficult if a busy senior person wants to close out a debate, feels they have heard an argument before, and is inclined to trample on the views of their juniors.

In conclusion, we discussed a number of broader governance issues, and the pressures companies face to adopt prescribed solutions to difficult balances between safety and other issues. For example, BAA was currently responding to safety initiatives triggered by

- Its aviation safety regulator, CAA
- The Cullen report, which recommended companies to establish senior safety leadership groups, and
- HSE's "Revitalising Health & Safety" initiative, which among other things advocated nominating a main Board Director with particular responsibility for safety.

BAA's response to these various pressures had been to nominate a responsible Director, and establish an Executive Health, Safety, Security and Environment Committee. There were several positive aspects of this, but Alan was concerned that these appointments would in the long term lead to the main Board, where the primary governance function of non-executives was exercised, devoting significantly less time and scrutiny to safety, rather than more.

Summary Observations

BAA, like many other companies, faces difficult decisions balancing safety and other values. While great strides have been made in the company process for identifying risks and their significance for decisions, there is great nervousness at Board level about making safety, security and other such values explicit. Key lessons for bridging the gaps between experts of different varieties and senior decision makers include

- Consistent application of an agreed process and risk framework, in which the roles of the decision makers and of the advisers are clear
- Face to face discussion among the various interested parties and specialists
- High quality preparation and facilitation of such sessions.

CASE STUDY – BRITISH MEDICAL ASSOCIATION

The Organisation

The British Medical Association (BMA) has been the professional organisation of doctors since 1832, and their Trade Union since 1970. BMA provides policy advice to Government, regulatory bodies, and doctors. Much of their advice to doctors is published via the British Medical Journal (a subsidiary organisation of BMA) and associated BMJ publications such as the British National Formulary. The respondent for this study was Prof. Vivienne Nathanson, the BMA's Director with responsibility for BMA's "professional leadership" activities.

Nature of Decisions

Doctors and medical professionals constantly make decisions in the face of limited knowledge, uncertainty, and differences of opinion among specialists. A key difference for most doctors from the situations dealt with by a regulator such as HSE is that for most doctors, while they deal with life and death every day, their decisions affect only one individual at a time. Advice on policy and practice of course can affect many more people if it is taken up and applied across the profession.

The case study interview covered a wide range of medical issues, chosen for their broad parallels with issues of interest to HSE:

- permissioning of new drug treatments
- development of policy advice, and
- "operational" interactions between doctors and patients

On these topics, Prof. Nathanson spoke from her general experience in the medical profession and as technical head of profession in BMA. She then brought together the BMA "head of profession" and "Trades Union" perspectives, to provide a summary of what would be her expectations as to how organisations and professional staff should work to resolve significant differences of technical opinion.

New Drug Treatments

New drugs are licensed by the Medicines Control Agency, under the provisions of the Medicines Act. Almost any active substance will have unintended side effects as well as the intended effects, so the process takes careful account of the evidence for benefits (effectiveness in delivering the intended results) and disbenefits (undesired side effects). This is done via the well-known three phase approach to drug testing. But the licensing decision is almost always made in the face of limited knowledge. Even a very large scale Phase 3 clinical trial involving hundreds or thousands of patients is unlikely to reveal "one in a million" type side effects.

There is a difficult balance of public expectations to be managed. Many people expect drugs to be "100% safe" when licensed, and regard anything less as a failure on the part of the authorities. On the other hand, people who are desperate often want to try almost anything, however untested, if it offers a glimmer of hope in an otherwise hopeless situation.

Difficulties typically arise in dealing with rare, late or unexpected side effects. A decision has to be made about how great the risk is, and whether to accept it. The decision about acceptance takes into account other factors than the risk itself, in particular, the practicality of achieving the intended effects of the drug by other means. If the drug is a "me too" substance, then it is likely to face a stiffer acceptance test. If on the other hand it offers unique benefits then a higher risk of side effects may be tolerated.

In a typical licensing situation the applicant will be arguing strongly that the benefits of a drug outweigh the disbenefits, but will be receptive to an argument that side effects may be unduly risky – the drug company will carry responsibility for that risk, which could be very expensive. The MCA relies on a structured process for evaluation of the applicant's case. Unusual and important issues can be referred to an expert committee for advice. If the MCA response is negative, then the applicant faces the choice of whether to collect new evidence and resubmit, or to drop the application. Given the scale of the commercial issues at stake, it is very important for the MCA to be able to defend its position, and to articulate clearly the basis of any refusal to license a drug. Often the issue in dispute is not as black and white as "whether to license or not". In many cases, differences arise as to what conditions and constraints should be attached to prescribing and using the drug.

Because of the inherent uncertainty in taking a drug tested on hundreds of people and releasing it for use, potentially, on millions, the licensing regime is accompanied by a well-developed system for monitoring and acting on suspected adverse reactions to drugs. The pharmaceutical companies run their own monitoring schemes, side by side with the Government's own monitoring via the medical profession. Pharmaceutical companies today are quick to withdraw drugs if they have reason to suspect that they may be generating a future liability.

All doctors receive an updated copy of the British National Formulary (BNF) every 6 months, which contains among many other things a stack of yellow "Suspected Adverse Reaction" forms. These are to be filled in and submitted to the Committee on Safety of Medicines whenever a suspected adverse drug effect is encountered. Typical GPs might complete 1 or 2 (or 0) such forms per year; hospital doctors generally complete more. There is no "enforcement" of consistency of reporting, but most doctors regard this as an important duty and take it seriously. The Committee reviews all such reports regularly, and revisits the case for licensing of the drug if significant effects are found.

Key features of this system of general interest for regulatory decision-making include:

- the decision is almost always made in the face of significant uncertainty
- there is a well-established process for monitoring and reviewing the outcomes
- the permissioning body and the applicant have a common interest in avoiding risks
- conflicting public expectations have to be managed, and
- transparency of decision making is very important.

Policy Advice

We discussed several facets of BMA's role in developing policy advice, focusing in particular on advice to doctors, and policy advice to Government.

A good example of BMA's advice to doctors is contained in the British National Formulary (BNF). This is every doctor's daily reference guide to drugs and their uses. It is produced by the BMJ with the Royal Pharmaceutical Society of Great Britain and disseminated to every doctor in the UK every 6 months, under contract to the Department of Health. Differences of opinion about drugs and their use are resolved using a variety of mechanisms, typically including

- BNF monographs (a single person or small group collating evidence and views)
- review by the Committee on the Safety of Medicines
- advice from the Chief Medical Officer.

A typical high profile example of differences of opinion is that concerning the contraceptive pill. Underpinning several people's difference of view on this issue have been different interpretations of the very basic question "Is it a medical treatment?" Differences are as likely to arise from different value judgements about the benefits in relation to disbenefits, as from different interpretations of evidence as to risks and effectiveness. As a professional body, the BMA is concerned to build a strong consensus; they have no axe to grind about society's or the profession's values, but it is very important that their professional advice, if followed, will not lead doctors into major conflict with society's values.

The BMA regularly produces reports on important health issues to inform, and sometimes to influence, public debate. Recent examples include reports on sexually transmitted disease, housing & health, and drugs in sport. The BMA approach involves

- convening a small group, often with a lead individual, to collate and review relevant material
- testing any conclusions and recommendations on experts, singly or in groups, often using the appropriate standing Committees
- assembling text for modules of a report, then reorganising and presenting the material specifically for the intended audience and purpose.

A particular aim is to avoid drafting reports by Committee, or having sections of a report meant for a public and political audience written by experts writing on their pet topic. As an example, Prof. Nathanson cited the book "Biotechnology, Weapons and Humanity", where a single lead author had worked with a small committee of three people – the author, Prof. Nathanson, and a Red Cross expert – to develop a reference work which had proved very useful recently in helping understand the risks associated with terrorist use of biological weapons.

By way of contrast, Prof. Nathanson mentioned a report from SEAC (the Spongiform Encepalopathy Advisory Committee) on vCJD in people. The BMA's Ethics Committee had reviewed the report and said that it was the "worst public document they had seen, bar none". The problems lay in failing to communicate effectively with the general public (it is important always to explain issues from first principles, not to assume prior special knowledge), lack of clarity as to the audience for and purpose of the report, and failing to explain uncertainty and its implications.

There is an important general challenge for experts and groups of experts, to be open about uncertainty. There is often pressure on experts to reduce uncertainty, and an expectation from decision makers that the better the expert, the narrower will be the band of uncertainty. Accepting that the "best expert view" is that something is very uncertain may be difficult, but is vitally important. The key issue is to provide quality advice about what can reliably be inferred or done in the face of uncertainty, openly expressed.

Everyday Patient Interaction

In the surgery, the General Practitioner is typically in a position of sole responsibility. A key decision to be made by GPs concerns when they should refer patients to someone else for specialist advice or for a second opinion. In hospitals, doctors more often work in teams, and differences of opinion arise more regularly. An example might involve deciding on the best treatment for a case of angina, where different doctors might be proponents of surgery, of using a "balloon" treatment, or of a drug-based approach.

While there is always a consultant with ultimate responsibility for each hospital patient, in an ideal situation no doctor would use their position to "trump" the judgement of their colleagues. If doctors directly involved in treatment decisions disagree, they would typically bring in an outsider for a different opinion.

A key area of difficulty where Prof. Nathanson and the BMA would like to see change made is in the involvement of the patient. Ideally, the medical team informs the consultant, the consultant advises the patient, and the patient decides on their treatment. As the Bristol case has painfully revealed, there can develop a culture in some hospitals (as in any other sort of large organisation) of not questioning and challenging the opinions of senior people.

Prof. Nathanson related the story of a GP friend of hers who had been accompanied by a student for a day. After a consultation with a patient, the student, to the GP's surprise, asked whether the GP would be interested in her (the student's) assessment of the GP's performance in handling the consultation. The GP accepted, and the student, who had been trained to offer such 360^{o} assessment in a non-threatening and positive way, provided an assessment which the GP found very insightful and helpful. Such examples should be the norm, not the exception.

The problems of failing to expose uncertainty, not inviting differing opinions, and not helping the appropriate decision-taker make the best decision for them, are easy to identify in this situation. The solutions can also be identified – training, and re-setting practitioners' expectations along the lines of the anecdote above. One of the major challenges facing the profession, though, is to make changes of behaviour happen on a large scale - "operationalising" the awareness of the problem, and of the behaviour to deal with it.

Realistic Expectations

Prof. Nathanson drew on both her "professional head" experience and the position of BMA as a Trades Union for a large body of professional staff in bringing together a summary of her expectations – first, of organisations, and second of the professional staff – for dealing with differences of professional opinion.

Organisations

1. Doctors or other specialists called on for advice should be fully briefed on the context of the decision to be made and the outcomes that may depend on their advice.
2. Organisations should promote and encourage openness about uncertainty, and willingness to expose difficult or critical decisions to others' opinions. Opportunities should be provided for people to challenge each other's professional opinions in a non-confrontational way.
3. The basis of decisions should be clear and open. If specialist advice is not adopted, clear reasons should be given.
4. Differing specialist views are best resolved by bringing the protagonists together, identifying the common ground, and thus clarifying the specific areas of disagreement.
5. Facilitation of committees or other meetings for building consensus is a key issue. The coordinating individuals or organisation need to be well respected people, able to deal on an equal footing with the experts, but not necessarily expert in the field of debate.
6. Those interpreting expert advice for decision makers to use must have the ability to evaluate the evidence and detect and deal with biases and unsupported opinions.

Staff

1. Doctors or other specialists should provide a clear explanation of why they have reached their opinion, distinguishing between evidence-based and judgemental or apocryphal arguments.
2. Specialists should be able to justify the basis on which their expertise rests, and why it is relevant to the situation on which they are offering advice.
3. Experts should expect, and be prepared, to sit down with others, to have their views challenged and to discuss and defend them.
4. Experts should be ready to challenge the views of others, and able to do it in an effective and non-confrontational way.
5. Experts should recognise and be open about their interests in relation to the decision to be made. Professional, emotional and other preferences for one side of an argument or another are just as important (if not more so) than direct financial interests.

Summary Observations

Doctors live with uncertainty and differences of professional opinion all the time, and have evolved a variety of ways of dealing with it. Important general issues include

- Exposing uncertainty and differences of opinion
- Face to face discussion to resolve differences
- Care and competence in adapting specialist advice for non-specialist decision makers
- Changing behaviour, not just identifying problems and solutions, and
- Monitoring decision outcomes, and being ready to review and revise decisions as more information becomes available.

CASE STUDY – CIVIL AVIATION AUTHORITY (CAA)

The Organisation

This case study focuses on the activities of the Design and Production Standards Division of the CAA's Safety Regulation Group, based at Gatwick. The Safety Regulation Group is the UK's aviation safety regulator, responsible for the licensing of aerodromes, air traffic control, aircraft and pilots. The Design and Production Standards Division is responsible for certification of UK registered aircraft (which includes initial certification of designs and ongoing assurance that airworthiness is maintained). The Division also provides the UK input to the international Joint Airworthiness Requirements that establish airworthiness standards.

The respondents for this study were Mike Bell, Head of Design and Production Standards Division, and Ian MacLaren, a Design Surveyor in the Avionic Systems Department. The Division has about 100 professional surveyors (typically degree qualified, with 10+ years industry experience, and 2+ years induction, training and team-working within CAA before "flying solo" as surveyors) under Mike's leadership. Mike in turn reports to the Director of Safety Regulation, but is also accountable to an Airworthiness Requirements Board established under the Civil Aviation Act to oversee and ratify the decisions of his Division..

Nature of Decisions

Policy and standards of airworthiness are established internationally. The UK or any other country can put in place its own special conditions for an aircraft, but there have to be very good reasons for doing so and thereby departing from international harmonised standards. UK input to standards is provided by surveyors and managers from the Division who are involved in drafting and reviewing requirements documents, and in attending and contributing to the work of international requirements committees. A small separate Requirements and Policy Section co-ordinates requirements development, but surveyors and managers are typically involved in both certification and requirements development activity.

A typical surveyor's activity might cover equipment approval (certification of new equipment) (approx 10% of time & activity), certification of installations and modifications to aircraft (approx 60%), and development of airworthiness requirements (approx 30%). Typical decisions faced of relevance to this study are:

- what should the airworthiness requirements be?
- is a particular design compliant with the relevant requirements?
- are systems compliant in the way they are installed, used and maintained?

The Decision Makers and the Specialists

In establishing airworthiness requirements, the decision making unit is generally an international committee. In certifying aircraft, a Project Certification Manager typically leads a project team with individuals from several countries. Both the requirements committees and the certification teams work under the auspices of the Joint Airworthiness Authority, which defines the processes to be followed in setting requirements and in certification.

CAA relies on its surveyors to be highly self-reliant in representing CAA's views on international bodies. A surveyor will typically be the sole CAA representative on his or her committees, and may have to work and make detailed decisions at the meetings without referral back to their colleagues. However where a surveyor feels that he/she needs to discuss a matter further, further discussions and advice with colleagues at SRG may be sought.

Ensuring that individuals are able and well-prepared to act on CAA's behalf is thus of major importance for the Division. Whether working on a certification project, or with a requirements committee, the key decision-making meetings are programmed well in advance, so that surveyors have the opportunity to consult colleagues before the event. Debriefing meetings at CAA are held after some key international meetings, at which the surveyor involved exposes the critical issues to colleagues, invites their views, and discusses the emerging recommendations of the international team.

In comparison with many other regulatory situations, decisions about airworthiness tend to be made by people and committees with a very high degree of technical expertise. The decision-makers, though, are still reliant on specialist input and advice on a wide variety of specialist topics. This advice is provided by their colleagues in their own organisations, their counterparts in other countries, and by specialist consultants, researchers and contractors.

Issues and How They Are Dealt With

Initial differences of opinion about whether and how an aircraft complies with requirements arise frequently between CAA and manufacturers/operators. The vast majority of these, though, are resolved by reference to the relevant requirements documents that are applicable to the aircraft. A large part of a surveyor's work involves building up a detailed knowledge of the requirements and their application, so that they can help designers and operators find the relevant requirements, and understand and apply them. Once agreement is reached on what are the relevant requirements, the manufacturer or operator should prepare a certification plan and agree it with the CAA. The surveyor will review the received documentation against the agreed requirements and find compliance with the requirements.

Provided this process is followed disagreements over whether or not a system is compliant should not occur. In six years as a surveyor Ian MacLaren had not encountered a situation where need for compliance with the requirements was questioned. An area in which significant differences regularly arise and have to be resolved is in deciding what the requirements for aircraft ought to be. For new and innovative aircraft, such differences are anticipated, and substantial technical effort goes into building a consensus as to what is necessary. Example 1 below describes how this is being done for the new Airbus A380 aircraft, and the arrangements for resolving differences of view. Ian MacLaren's overall view, having worked with this and several other international certification teams, was that the process is fair and open, and works well. He had never encountered a situation where agreement could not be reached, or where he (or colleagues in CAA or in other regulatory organisations) felt that decisions were being taken which over-rode their technical judgement.

Differences can often be more difficult to resolve when modifications to existing aircraft are being considered, particularly in response to changes in airworthiness requirements, or to major accidents. Example 2 below relates to an internal UK decision to adopt a special condition relating to cabin safety as a result of CAA's interpretation of an accident investigation report. Example 3 concerns the issues that arose in re-certification of Concorde following the Paris accident in 2000.

The overall judgement of both Mike Bell and Ian MacLaren was that, while differences of professional opinion among regulators, and between regulators and the regulated, are inevitable, they seldom cause major problems in aircraft certification.

CAA Example 1: Certification of the Airbus A380

The A380 is a new large-bodied aircraft incorporating many innovative features. Ian MacLaren, one of the respondents for this study, has recently got involved with the JAA team responsible for certification of the design. Significant features of the team and the process include:

- the certification team is highly multinational – Ian is working routinely with French, German, Dutch and Italian colleagues.
- the team is led by a Project Certification Manager, who produces the procedure to which the team works, and co-ordinates their activities
- misunderstandings do arise, but generally because of language differences, not to differences of view over new technologies and how they should be treated
- the process for resolution of disagreement within the team involves
  – those involved writing a Certification Review Item (CRI) document
  – discussion among the team aiming to develop a consensus
  – escalation to the Project Certification Manager if no clear consensus
  – reference to a JAA Certification Standards Panel (CSP) if still no consensus.
- the process for resolution with the applicant (Airbus) involves
  – initial briefing to the team by Airbus
  – the team establishing the key issues (Certification Review Items, or CRIs)
  – drafting and agreement of CRI documents within the certification team
  – review with Airbus before CRI documents are finalised and incorporated into the certification documentation.

CAA Example 2: Aircraft Safety Modification

A major accident investigation report into an aircraft fire observed that cabin crew, when strapped in for take off and landing, could not directly observe all the passengers for whom they would be responsible in the event of an evacuation drill. It was noteworthy that the accident report made it clear that this had not been a contributory factor to the fatal accident, but suggested that it could be, in future.

The requirements covering this area, while quite detailed, do not explicitly require that the crew should have this "direct view" of the passengers, and so this became an "interpretation". CAA was unsuccessful in gaining international agreement to this interpretation and both the FAA and JAA (Federal Aviation Administration and Joint Aviation Authorities) were unsupportive.

CAA believed the cost of the modification to be small compared to the purchase cost of the new aircraft, and proceeded to establish a UK special condition. (Each member state of the JAA can establish, after proper process, its own local variations on the JAA requirements, in the form of special conditions that apply only to aircraft registered in that state.) Some years later, when the first of type was due to arrive in the UK, the modification was to be billed to the airline at $1m per aircraft, and unsurprisingly there were representations made to CAA.

The decision was reviewed using the regulatory impact assessment (RIA) technique, and it was found difficult to quantify the benefits. No examples could be found where it could be directly shown that this modification would have saved lives. As a result CAA withdrew the special condition. This could have been divisive for the staff previously involved, but the time elapsed between establishing the condition and implementing the modification (5 years), the excessive cost of the modification, and in particular, the application of the RIA principles were most helpful.

CAA Example 3: Concorde Re-Certification

Following the Paris accident in July 2000, there was a major international review of Concorde's safety with respect to take-off accidents. There was considerable initial uncertainty as to the cause of the fuel leak whose ignition led to the disaster. A key piece of evidence was a piece of fuel tank on the runway with tear marks proving it had been forced ***outward*** from the tank by a force from within. Computer simulations showed that an initial external impact by a tyre fragment could cause a pressure wave in the fuel which, when reflected and amplified by the tank walls, could cause the major tank failure. This was considered the most likely explanation of the accident. But tests never managed to replicate the failure mechanism thought to be responsible.

The uncertainty surrounding the cause led to attempts to find a solution in each of the three areas where, in principle, this risk might be reduced:

- preventing tyre failures and other sources of impact onto the tank
- preventing minor impacts & failures escalating into major leaks, and
- preventing leaks igniting.

Tests showed that small leaks were very unlikely to ignite, suggesting that if major leaks could be avoided the risk would be greatly reduced. New Kevlar armour for the inside of the fuel tanks was then developed, whose main purpose is to restrict the flow of fuel in the event of a tank breach. Computer simulation and large scale tests showed that this would be effective for a very wide range of fuel tank failure mechanisms. The armour greatly reduced the fuel escape rate.
The Authorities and airlines were debating the detailed cause of the accident and the effectiveness of the proposed solution (the Kevlar armour) very intensively. But the uncertainty continuing to surround the cause of the accident, and hence the reliance that could be placed on the proposed solution, made it hard to reconcile all the different views of those involved.

What finally resolved this issue and made it possible to certificate the aircraft with a high degree of agreement among regulatory bodies was the development of a new tyre design which was shown to have reduced the risk of a tyre bursting and fragmenting on take-off. The solution adopted (new tyres, plus Kevlar armour in the fuel tanks, additional

armouring of electric wiring and changes to procedures) was considered acceptable because it would be effective against any of the causal factors which remained possible in principle, given the uncertainty that continued to surround the details of the tank failure mechanism in the accident.

Summary Observations

Differences of technical and professional opinion do not appear to have been a significant problem in the field of airworthiness certification. The main strategies for ensuring such differences, and their importance for regulation, are well managed and appear to be:

1. All the parties involved work within a very clearly defined, widely understood and accepted international framework for setting requirements and certifying aircraft. Once a certification plan for the equipment or aircraft is agreed, the surveyor/s can readily ensure that the equipment or aircraft is compliant with the requirements by reviewing the received documentation against the agreed requirements.
2. CAA puts a lot of effort into building a strong, shared understanding of the principles and requirements applied to aircraft certification among their Surveyors and managers (all of whom reached their jobs through a Surveyor career path). With only one or two exceptions all surveyors within CAA SRG have worked within the aircraft industry and have built up an understanding of the requirements, standards and compliance prior to joining the Authority.
3. CAA is proactive in ensuring the key issues (whether for certification or requirements setting) are exposed for scrutiny among peers within the organisation, for example through face to face debriefing sessions with colleagues for surveyors returning from overseas meetings
4. There is a strong governance framework for airworthiness decisions which ensures that important decisions are tested and accepted by the following, ALL of whom possess considerable in-depth technical competence and knowledge relevant to aircraft certification:
   - the lead surveyor
   – peer group colleagues in CAA
   – CAA management, and
   – the Airworthiness Requirements Board, providing independent input and review.
5. Where uncertainty is irreducible, and differences cannot be resolved by informed debate and discussion, decisions are made on a precautionary basis until uncertainty can be reduced and a consensus be reached.
6. Decisions can be revisited when new information becomes available or a value judgement made some years ago is challenged by stakeholders. This can be very difficult to do as it may appear to be challenging or questioning the judgement of senior and experienced professionals, but is vitally important.

CASE STUDY – OFFICE OF THE CIVIL SERVICE COMMISSIONERS

The Organisation

The Civil Service Commissioners are senior people, independent of government and appointed under Royal Prerogative to maintain selection on merit on the basis of fair and open competition in recruitment into senior Civil Service positions, and to hear and determine appeals by Civil Servants under the Civil Service Code. The former duty dates back to 1855, while the latter dates from the introduction of the Code in 1996. The Commissioners are supported by a small unit, the Office of the Civil Service Commissioners (OCSC). The respondents for this study, Jim Barron and Fred Jaeger, are the Secretary to the Civil Service Commissioners and the Recruitment Regulations and Appeals Adviser in that unit.

The Civil Service Commissioners heard an appeal from an HSE member of staff in connection with permissioning of Offshore Installations in 1999, and made a number of recommendations for strengthening of HSE practice in relation to dealing with this issue. This discussion note does not focus on the HSE case in particular, but includes some general observations from the OCSC on some of the issues involved.

Background to the Civil Service Code

The possibility of developing a Civil Service code of conduct in the current form had been discussed for some years, before a Select Committee took on the job of producing a draft in the mid-1990's. The draft Code was also considered by the Nolan Committee. It was brought into effect on 1 January 1996.

The Code is concise. It consists of 13 Articles to be followed by Civil Servants, and is linked to a parallel Ministerial Code. The Articles advocate the principles of integrity, honesty, impartiality and objectivity, and are intended to help Civil Servants understand where their duties lie. Article 11 states that Civil Servants should report instances where they believe they are being asked to act in a way which is inconsistent with the Code. Article 12 states that where a Civil Servant has reported such a matter and believes that the response from their Department is not reasonable, he or she may report the matter in writing to the Commissioners. This is what happened in the HSE case.

The Commissioners receive few appeals. Some approaches do not fall under the terms of the Code but are for resolution within Departments through normal personnel and management channels. Before the advent of the Code, Civil Servants had a similar right of appeal to the Head of the Home Civil Service, who had received one appeal in the previous decade.

Appeals to the Commissioners are thus quite rare, and a recent phenomenon. They do not provide a substantial body of "case histories" from which more detailed general principles of good practice can be deduced. The OCSC does, though, have visibility of a very wide range of contentious issues at the interface between individuals and Civil Service organisations, some of which are relevant to this study.

Some Important Issues

A number of points the author felt emerged in discussion of the issue of resolutions of differences of expert opinion, from the viewpoint of a manager relying on expert advice:

1. A Civil Service manager relying on experts for specialist advice is in a difficult position if they do not have access to relevant expertise to help interpret that specialist advice.

2. The non-expert manager needs to be confident he or she has given proper weight to the expert view, in a manner appropriate to the consequences of the decision. Conversely, the Civil Servant providing expert advice needs to be aware of the context when developing and offering that advice.

3. The non-expert manager should test expert advice and ensure that its significance and provenance is reflected in the decisions reached.

A clear implication of all of these points is that Civil Servants who do not possess domain knowledge in areas where they must make decisions should have access to colleagues who do possess such knowledge, in order to help them frame their questions and interpret the advice they receive.

A general observation the author would make on HSE's position as a regulator was that the ALARP principle which underpins the Health and Safety at Work (etc) Act and all of HSE's work, is particularly difficult to apply and interpret. The thrust of several of the Commissioners' recommendations to HSE had been that particular effort was warranted to help staff at all levels understand and apply the principle consistently.

A very important general issue for the Civil Service is the tension between risk taking and the public need for certainty. This can often lead to pressure from above on specialist advisers to provide "advice" which is more definitive than may be warranted. This can all too easily shift the burden of decision making from the decision maker onto the experts involved.

A final observation on the role of the Commissioners is that it is a purely reactive one in terms of dealing with issues as they arise. The Code and the Commissioners are generally regarded across Government as something of a "long stop", rather than having a positive purpose. The Commissioners and their Office have no duties or resources to promote good practice, or to monitor and measure "good public administration" in any active way. However, Mr Barron and Mr Jaeger emphasised the need for civil servants to appreciate the responsibilities that the Code placed on them in terms of positive action, and their concern that the Code should not be perceived just as defining unacceptable conduct.

Summary Observations

The Civil Service Code lays down important, general principles for Civil Servants to follow which apply both to senior decision makers and to technical experts working in the public service. The Code and the body of case experience of the Commissioners provide no explicit or definitive statement of expectations in dealing with differences of opinion, but do provide some pointers to expected practice in using expert advice in developing decisions.

CASE STUDY – DTLR

(Department for Transport, Local Government and the Regions)

The Organisation

DTLR is the Government department responsible for transport, local government, and the regions. Most of the activities within its remit are managed locally by the appropriate local Government organisation or by Agencies of central or local Government. DTLR provides funding and policy leadership across a very wide range of issues. The respondent for this study was Dr. David Fisk, Chief Scientist of DTLR, who previously occupied the equivalent post in DETR (the Department of the Environment, Transport and the Regions) before DTLR was established.

The discussion on which this case study is based ranged across a wide range of relevant matters and issues within Dr Fisk's personal experience, and was not confined solely to DTLR issues. Many of the points raised are thus personal observations by Dr Fisk, rather than being indicative of DTLR experience.

Nature of Decisions

DTLR provides funding policy leadership and financial and legal empowerment for a very wide range of locally managed services and activities. There are various regulatory units within and/or accountable to the Department (for example Building Regulations fall within the Department's remit, and a large volume of permissioning, inspection and enforcement activity is carried out by Local Authorities), but DTLR at the centre is not directly involved in large volumes of regulatory activity. It is involved, though, in major planning applications (for example for roads, new airport facilities), and thus in "permissioning" types of activity.

Typical decisions on which DTLR advises Ministers might thus involve permissioning (for example, "should consent be given for new infrastructure to be built?") or policy (for example, "how best should we deal with road congestion?").

During the interview we explored a wider variety of situations involving decision making in the face of significant differences of view among technical experts, including Dr. Fisk's experience in DETR, and observations on situations outside DETR or DTLR.

Issues and Examples

Climate change: Here, international policy makers had very much followed the kind of approach advocated by Lord Woolf[1] towards expert evidence in the face of conflict in that they

- invited different experts' views
- sought to identify the areas of agreement and narrow the areas of difference
- examined the significance of those differences for policy

[1] Lord Woolf's review of access to justice in 1996 specifically adressed the issue of expert evidence and how to deal with differences of expert view. A precis is provided in the main body of this report.

- developed recommendations based on science ***and*** other policy factors, and
- flagged up when the issues should be revisited, and what should be done in the meantime to help reduce uncertainty.

Lord Woolf's recommendations are, in Dr. Fisk's view, a good starting point in establishing expectations and good practice in resolution of differences among experts in any quasi legal context (though probably irrelevant to purely commercial decisions for companies like BP or Shell].

Dealing with the Dynamics: Identifying when an expert view should be later reviewed, and who should make sure that such review happens, is in Dr. Fisk's experience a common area of weakness in Government's use of expert advice. The Southwood report on BSE was a good example of an expert review which was completed, then sanctified rather than revisited for a decade.

A good example of a public service situation where decision making is extremely dynamic is a military campaign. Generals constantly take decisions in the light of uncertain and conflicting advice and evidence. They are very experienced in deciding only as much as the information supports and the risk situation demands, then constantly reviewing their decisions as information develops. [Note – this would be an interesting case study to explore, but time has not permitted it in this research.]

Disciplinary Bias: A persistent difficulty for decision makers is that whole fields of science can, and not infrequently do, tend to adopt a contemporary (i.e. fashionable!) collective mind set on issues which may not have a strong evidential basis. Examples include

- Geographers and geologists agonise over the significance of asteroids and other extra-terrestrial matter hitting the earth, because of its importance for what can be inferred about the earth by examining it. Astronomers are more relaxed and see no reason why the earth should not constantly be receiving a modest intake of such matter.
- Biologists for many years had never considered the effects of electro-magnetic fields on animal cells, and consideration of the health effects of EMFs had thus started from a presumption of "no effect".
- Biologists tend to presume against the possibility of the horizontal flow of genes, which would cloud parts of the theories of speciation.

Differences of Approach: Very different approaches to resolution of difference were employed, and different types of outcome achieved, in different situations. For example

- Congestion charging - there is widespread agreement about the problem; the differences to be resolved are both "technical" (how effective will different solutions be?) and political (preferences for different solutions)
- Transport planning – the planning process and major inquiries such as that for Terminal 5 at Heathrow resolve issues in a democratic way, but are not designed to address the fundamental underlying issues
- Public Inquiries - adopt very different approaches to resolving differences between experts. Some promote face to face debate and discussion among the experts (adopting the "Lord Woolf" style approach). Others, such as Lords Cullen and

Roxburgh, in their recent inquiries into Ladbroke Grove and Sellafield/Nirex, prefer to examine experts individually and develop their own views, with the assistance of expert assessors.

- Scientific Committees – are good at building consensus and identifying residual issues and uncertainties on fundamental scientific issues, but are not a mechanism to build a social consensus about what should be done. They seldom expose their interim conclusions for comment
- Professional Bodies – such as the BMA or the Engineering Institutions, often aim to establish practice that will be widely acceptable, helping choose the best solutions in situations where there is no one precise answer to a question.

The conclusion of this part of the discussion was that the optimal approach to dealing with differences of opinion should result from considering the outcome sought. There is only one correct answer to the question "How far is it to the nearest star?" but there are many different ways to build a bridge over a road. How to resolve differences of opinion should depend on the nature of the question, and also on the decision to be made and the outcome sought from resolving difference between experts.

Summary Observations

This case study provides a selection of interesting observations and examples across a wide variety of fields. The key points that emerge (which were not intended to be an exhaustive list) are

- The criminal and civil justice system, and in particular Lord Woolf's report, provide a good starting point for consideration of how to deal with differences between experts. US legal practice (e.g. in the *Freye* and *Daubert* judgements) offers further insights.
- Temporal Dynamics are very important; where there are differences and uncertainties knowledge will evolve and change with time – advice needs updating, and decisions revisiting
- Disciplinary presumption is a significant hazard of which to be aware
- There is probably no one preferred approach to dealing with differences of opinion; the method used should reflect the nature of the issue, its significance to the decision, and the nature of the outcome (e.g. consensus or truth?) sought.

CASE STUDY – FOOD STANDARDS AGENCY

The Organisation

The Food Standards Agency (FSA) is a new body established in April 2000 charged with protecting the public's health and consumers' interests in relation to food. It is particularly involved in policy decisions about what risks are acceptable, what advice should be given about food risks to the public and professionals, and what regulations and restrictions should apply to foods generally. The respondents for this study were Dr Jon Bell, the Chief Scientist & Deputy CEO, and Dr Andrew Wadge, head of Chemical Safety & Toxicology.

Nature of Decisions

Policy issues include, for example, evaluating the risks associated with foods and contaminants in food, and setting appropriate standards. Policy advice is given to UK and European Ministers, to the food industry, and directly to the public.

Approvals for new types of foods to be put on the market are generally granted by the European Union, though the FSA and their committees are often involved in detailed safety evaluations. The FSA manages a large programme of sampling of foodstuffs and testing for contaminants, and takes action in response to the findings of this surveillance. The FSA does not give permission for foods to be sold, but has the power to mandate that foods be removed from sale, or to place constraints on their sale and use. Local inspection and enforcement activity, for example of hygiene regulations, is the responsibility of Local Authorities and other agencies.

Decisions, whether about policy advice or about what to do about foods when potential health issues arise, rely heavily on expert scientific advice. As a regulator, the FSA has to decide what constitutes an acceptable standard, judge whether the examples it sees are compliant with standards, and decide what to do if they are not.

The Decision Makers and the Specialists

The FSA contains a number of relatively self-contained Divisions, in each of which policy and technical staff work closely together. A deliberate break from the MAFF and DH practice of separating policy and technical staff into different parts of the organisation was made, because of the problems this policy-technical divide had created in the past. A good proportion of staff at all levels in the organisation, up to and including the Board, have scientific backgrounds.

The first source of expert advice which people in FSA rely on is their colleagues. The organisation also makes substantial use of external advice, via standing expert committees (for example the Committee on Toxicity, COT) and via ad hoc work, typically individuals or small groups of experts engaged for a specific one-off project.

Issues and How They Are Dealt With

Differences of opinion among experts are the norm rather than the exception on food safety issues. Dr Bell laid out some clear expectations of FSA staff and external advisers in resolving such differences:

1. People are expected to express their views openly, and to be prepared to justify them and test them in argument and discussion
2. People are expected to forge a consensus as to the best way to proceed which resolve differences as far as possible, and recognise those that remain
3. FSA aims to be open about uncertainty, to reduce it where practicable by research, and to revisit its decisions as knowledge develops and uncertainty reduces.

Our discussion then covered a wide range of issues to do with the resolution of differences of opinion, which are grouped here into four main areas.

1. **Dealing with Uncertainty**: Openness is a guiding precept of the FSA. Many past problems have been created by failing to expose uncertainty or differences of opinion. It is vital that uncertainty is acknowledged, and that advice is developed which is robust in the face of that uncertainty. The FSA promotes a strong precautionary culture. In a recent example, when the FSA was asked to advise on the health risks from dioxins created by burning cattle on pyres during the foot & mouth epidemic, they were careful not to trivialise or dismiss the risk, despite the lack of direct evidence for harmful effects at low doses.

2. **Working with Committees**: Several issues were raised here, relating in particular to the important role of in-house technical staff in helping frame and make best use of Committees. For example

   - In-house technical staff are heavily involved in framing the questions put to Committees. The FSA is careful to ask questions more like "How large is this risk", or "Would A or B me more effective in reducing this risk?" rather than "What should we do about this risk?"
   - As part of this framing, and to make best use of Committee time, in-house technical staff collate the material a Committee is asked to examine, and provide good quality briefing to the Committee.
   - Once a Committee has deliberated, it is the responsibility of the Secretariat (i.e. FSA staff, not the Committee members) to draft any reports although these are not finalised until agreed by the committee
   - In-house staff are expected to test and challenge the advice emerging from Committees to ensure its relevance and robustness – an important function identified in the Phillips report.

   A good example of a Committee where this worked well was the Committee on Toxicity. A major contributor to this success is that the Secretary is herself a scientist of considerable reputation, who has worked for 15 years in the field, published widely, and is regularly invited to sit on international expert Committees in her own right (eg JECFA for WHO). She is supported by a number of well qualified PhD level scientists with considerable Government experience.

3. **Coherent Communication**: If differences of expert view can derail a policy then it is vital that a consensus is built as to what should be done in the face of those differences before the policy is announced. Several related points arose in discussion:

   - The FSA publishes the agenda and documents for its meetings in advance in order to elicit differing views and opinions and enable them to be considered.

- Communication is in its own right a major instrument of policy for FSA in doing its job of informing people and enabling them to manage risks. Ineffective communication will inevitably result in ineffective policy results.
- A quality Communications Directorate has been developed, whose staff work closely with others across the Divisions as issues emerge – they are not simply a "Press Office" whose role is to disseminate information as it emerges from policy experts.
- An interesting topical issue concerns whether to publish draft reports before they have been reviewed and agreed. This has been tried successfully for some larger, longer term reports, but conflicts with urgency where speed is important.

4. **Making advice practical and useable**: Another vital role for FSA staff (technical and non-technical) is to help translate expert advice from whatever source into useful, actionable terms for the intended audience. A simple example involved translating COT recommendations that caffeine intake during pregnancy should be limited to 300 mg per day into more user-friendly terms such as "4 cups of coffee".

Summary Observations

The FSA has put a great deal of thought and energy into how it resolves differences of expert views on food safety, and made great efforts to avoid the problems in this area which its staff had experienced earlier in their careers in other Departments. Clear expectations have been set. While it is early days and there is no complacency, management in FSA feel that a good start has been made in building an open culture that exposes differences when they arise, resolves them as far as is feasible, and develops policy without hiding them.

CASE STUDY – HEALTH & SAFETY EXECUTIVE

The Organisation

The Health and Safety Commission (HSC) is the UK's unitary regulator of health and safety at work, established under the Health and Safety at Work (etc) Act of 1974 (H&SAWA). The Health and Safety Executive (HSE) is its executive arm. As such, HSE's principal activities are

- Policy: setting of standards, production of guidance on the management of risks and on good practice in their control, and preparing proposals for regulation for consideration by the Commission
- Enforcement: inspecting workplaces for compliance with the law, and taking appropriate action to promote good practice and apply sanctions up to and including prosecution of offenders, and
- Permissioning: for certain high hazard industries, operators must submit safety documentation to HSE for acceptance or non-objection before they are allowed to operate. The specific industries subject to such "safety case" regimes are
  - nuclear
  - offshore installations
  - railways, and
  - major hazard installations (broadly speaking, factories whose activities involve a potential risk for people outside the site boundary).

HSE is the sponsor of this research. The principal respondents for this case study were the Project Officer for the research project, Mike Fountain, Head of HSE's Technology Division, and the client, Paul Davies, Chief Scientist and Director of Hazardous Installations Directorate. Interviews were held with a number of staff from different parts of HSE to provide an overview of different specialist and decision maker perspectives.

Nature of Decisions

In all its activities, HSE applies the ALARP test of compliance laid down in the H&SAWA. This is "Are duty holders under the H&SAWA controlling risks to people to a level which is as low as reasonably practicable? The general decision HSE has to make is thus "Is the risk I am looking at being controlled ALARP?" Answering this question will typically require as a minimum

- a suitable and sufficient assessment of risks
- evidence of reasonably established good practice for control of risks, and
- appropriate specific measures to address any unusual risks.

Typical sub-sets of the "what is/is it ALARP?" question thus include "how big/how significant is this risk?", and "what constitutes good practice in controlling this risk?" Interpretation of ALARP typically requires a combination of technical, situational and legal specialist knowledge. Differences of opinion can thus arise

- among the specialists (same discipline or different disciplines) within HSE

- between specialists and non-specialist managers & decision makers in HSE, or
- between HSE and external stakeholders

As a general principle, it is very important for HSE that differences of opinion, particularly in relation to interpreting what is ALARP, should be exposed and addressed. Staff with new ideas and knowledge should feel that they can challenge established practice and policy if they have good grounds for doing so. On the other hand, technical specialists have to recognise that their input typically forms part of a wider decision process balancing technical, legal and other issues and values.

The ideal is to have a culture where the organisation is receptive to challenge and to different views, and good at dealing with them. Dealing with differences does not always mean reaching a consensus; sometimes differences of opinion will remain, for good reasons, after the most exhaustive discussion. But it is very important for HSE that it can support its decisions and defend them internally and externally. So far as it can, the aim is to build a consensus among its own staff, among duty holders, and with society at large (who, through the courts, ultimately test HSE's decisions) as to what constitutes "ALARP".

The Decision Makers and the Specialists

All HSE inspectors are provided with a strong grounding in Health and Safety law, and all, once qualified, are empowered to interpret the ALARP principle in the course of their work. In principle, any qualified Inspector (which means most HSE technical and managerial staff) can enforce the law on an organisation if they observe significant breaches.

In practice, individual HSE inspectors are constrained by their terms of reference and procedures to involve and consult colleagues. The more important the decision, the more senior the level at which it will be taken. Major decisions are very seldom taken by an Inspector acting in isolation.

HSE has a high proportion of technical staff who are employed at all levels, from Directors and Senior Managers, to individual Inspectors in the field or in headquarters jobs. Each HSE regional office has its own group of technical support staff working closely with "front line" Inspectors. Each of the "permissioning" regimes employs significant numbers of technical specialists, organised in various ways. Technical staff are employed in policy roles at headquarters. A Technology Division comprising six specialist units based at Bootle supports the whole organisation. In addition, HSE calls on external specialist technical support from the Health and Safety Laboratory in Sheffield (formerly part of HSE, now a "next steps" agency), and from a wide variety of academic and commercial organisations.

Issues and How They Are Dealt With

Specific examples of the sorts of decisions and issues that arise regularly where specialist opinions might differ are shown in Table 1 overleaf. The three main areas of activity (policy, permissioning, and inspection/enforcement) are then discussed in turn.

Table 1: Some Example HSE Issues

Areas of Activity	Typical HSE Decisions/Issues
Policy	• do some risks require further control measures? • what are the "good practice" controls HSE should require as a minimum? • how should requirements be framed? (in regulations, codes of practice, industry standards ….)
Permissioning	• has the duty holder demonstrated their management of safety is controlling risks ALARP? • what minimum improvements should HSE insist on before accepting/not objecting to a safety case?
Inspection & Enforcement	• how significant is an apparent breach of the law? • what is the appropriate response? (prosecution, enforcement notices, formal letters, informal advice) • if challenged, how strong is the evidence and how should it be presented (e.g. in court)?

Policy

The main areas of difference that arise are where there are questions of fundamental uncertainty, and of value judgements. Some risks are extremely difficult to assess (for example, chronic health effects due to occupational exposure), or to attribute to a specific cause (for example, stress-related illnesses). In these cases, research and peer discussion among experts are the primary means of resolution.

In other cases there are fundamental scientific uncertainties, for example concerning the toxicity of chemical or biological agents. HSE uses expert committees to assist in such cases, and aims to apply good practice in appointing experts, in framing the questions posed to them, and in interpreting and applying their advice. A comment from the specialist unit on dangerous pathogens was that it had taken many years of hard work to build an effective working relationship with the advisory committees on dangerous pathogens and genetic modification, but that this had been well worthwhile.

Other issues are much more about priorities and values. Everyone in HSE recognises that far more attention is devoted to some quite small risks that nevertheless present a threat of rare but severe accidents (for example railways and nuclear installations) than to some quite large but more evenly and predictably distributed risks (for example due to people driving in the course of their work). From time to time HSE tries to stand back from the totality of its work and review and prioritise its efforts.

This has happened quite recently, leading to the current "Revitalising Health and Safety" campaign, focusing on a number of key risks which HSE considers merit a higher priority. Specialist advice, on the level of risks in the workplace, and the feasibility of achieving significant reductions, is vital to such policy decisions. Dealing with difference of view here is very important. There is no absolute right or wrong, but it is vital that there is a

good degree of consensus between HSE/C, those who create the risks and those exposed to them, other government departments, and HSE's own staff who have to make new initiatives work.

Permissioning

Differences of opinion do arise in all of these regimes about technical issues, but these, once identified, are usually relatively easily resolved. The differences that persist tend to be those that involve balancing technical and value judgements. For example, it can be difficult making a judgement about whether the proposed arrangements for controlling risk represent "good practice", or whether HSE should insist on a company going further to raise standards.

For new plant, HSE will often aim to persuade duty holders to take advantage of new technology or ideas to make a step improvement in health and safety. This is because the costs involved in making improvements at this stage are usually small compared to the safety benefits – a key element of the ALARP test. For existing plant, this may not be so. HSE always has to be aware that it is not the final arbiter in these decisions; if a duty holder disagrees they can always challenge HSE's opinion, and the matter will be resolved in industrial tribunals or the courts.

A particularly strong difference of opinion has arisen in the Offshore Safety Division (OSD) of HSE, where technical specialists based in London and Bootle (Merseyside) are involved in assessment of safety case submissions on behalf of safety case managers (the decision makers) based in Aberdeen or Norwich. Several specialists involved in fire and ventilation issues have expressed the view on a few occasions that a safety case had not satisified the test of ALARP for these risks. Their colleagues were not persuaded, and accepted a number of safety cases in spite of the specialists' recommendations.

One such case was referred to the Civil Service Commissioners, who looked into the case and, while respecting HSE's right to make the decisions it had, made a number of recommendations for improvements in process and practice. HSE has been implementing a number of such measures in OSD. This has prompted considerable interest and review in other parts of HSE, leading (among other things) to the commissioning of this research to explore and learn from practice elsewhere.

The main mechanisms used to resolve differences of opinion, within HSE and between HSE and duty holders, are the process adopted for safety case review and acceptance, and the development of openly shared acceptance principles. The acceptance process aims to identify potential differences of opinion early, flag them as issues for resolution, and enable them to be resolved before they become critical impediments to permitting operation. There is often much debate between HSE and duty holders about how far HSE should go towards codifying good practice in the form of acceptance principles. Some operators welcome this, as providing the clearest possible guidance on what will be acceptable. Others prefer less prescription, and more flexibility. It is interesting to note that the OSD example above lies well towards the "less codified" end of the spectrum.

Operations (Inspection & Enforcement)

Codification of what constitutes good practice and how ALARP will be interpreted in different circumstances plays a very important part in HSE's field work. Where an activity is replicated in many different workplaces all over the country, HSE will typically

work with the relevant industry association and/or professional bodies to develop guidance and codes of practice. These do not have the formal status of "compliance criteria", but are recognised as providing a valuable benchmark in assessing compliance. Companies are free to do things differently, but know that they can expect greater scrutiny of their arrangements if they go against the relevant guidance.

The most significant differences of opinion in this area tend to arise in connection with possible breaches of the law. Differences may involve

- assessing the scale or significance of a risk
- assessing whether a duty holder's arrangements were or were not ALARP
- deciding what expert evidence to use in court and how to present it.

Once breaches have been identified and notified to the duty holder, HSE staff know that anything material to the case may be made available to defence lawyers if the case comes to court. Adherence to procedure is very important in such cases. But it is also very important to use informal networks within HSE to provide rapid testing of the evidence, and of the possibility of differences of interpretation or position emerging later.

One of the issues that arises fairly regularly is that some technical specialists in HSE are brought into a case late in the day, once an important difference of view has already arisen (for example, part way through a court case). From the technical expert's viewpoint this is very frustrating, as HSE may already have taken a position that is not what they would have wished, and the outcome of the case may be prejudiced. One specialist commented "Sorting out differences among specialists is not the problem – the issue is finding out when there's something the specialists ought to be talking about in the first place".

Another very interesting difference of view can arise when expert witnesses are used in a court case. Typically the people involved might be the relevant field Inspector bringing the case, the HSE legal adviser or barrister, and an expert from inside or outside HSE. Calling an expert to assist a prosecution case can have unintended consequences – if a jury believes that "only an expert could have known that" they may feel a good deal of sympathy for a defendant.

Summary Observations

1. The ALARP criterion that underpins all HSE's work is not a crisp, definitive test but inherently involves the application of judgement; dealing with differences of expert opinion is thus a central issue for HSE throughout its work.
2. Dealing with complex technical issues is greatly facilitated in HSE by the presence of managers and staff at all levels with technical backgrounds.
3. Regulatory decisions are always open to testing in the courts. It is therefore vital that the strongest possible consensus is built among HSE decision makers and specialists, duty holders and other stakeholders as to the application of ALARP and the definition of what constitutes sufficiently good practice in risk control to comply with the law.
4. Close working is required between external and internal experts and decision makers for good decisions. This is easiest when people are co-located (for example in the dangerous pathogens unit at Bootle where inspection, permissioning and policy are all

handled within a small team), and hardest when people are separated (for example in the Offshore Safety Directorate).

5. Dealing with differences of opinion is as much or more about knowing when there is the potential for differences and a specialist should be consulted, as it is about resolving differences once they have been identified.
6. Process and procedure are very important for consistency and coherence of regulatory decisions, but informal networks and organisational culture are also extremely important, particularly when decisions have to be made quickly.

CASE STUDY – DYNAMIC LOADS ON STADIA

(Institution of Structural Engineers)

Introduction

Sport and leisure are important in many people's lives, and are a growing part of the economy. Stadia are one of the few sorts of places where very large numbers of people regularly assemble. While tragedies such as the Bradford fire and Hillsborough have heightened awareness of safety risks, designers and architects are becoming ever more imaginative in their creative use of space and materials in public buildings. There is a natural tension between designers "pushing the limits" and regulators taking a more cautious approach to the setting of standards. This case history covers two issues: guidance for temporary demountable structures, and guidance on assessment for permanent stadia. The respondent was Dr Sue Doran, Technical Director of the Institution of Structural Engineers, under whose auspices the guidance documents were/are being developed.

Demountable Structures (1990's)

Outdoor events increasingly use demountable structures to provide temporary seating, staging etc. 17 people were killed and 2400 injured in the collapse of such a structure at Bastia in Corsica in 1992. The UK suffered some serious collapses, fortunately without fatalities, in 1993 and 1994, at a Gospel meeting and a pop concert respectively.

The Institution of Structural Engineers (ISE) first became involved in this issue in 1993, when the Department of Environment, which was then responsible for building regulations, asked the ISE to convene a committee to review standards relating to the design and use of such structures and make recommendations for change.

The ISE established a committee, largely of ISE members. The affiliation of members was not published in their report, which was issued in 1995. Although endorsed by the Department of the Environment, it met with a mixed response, with a number of practitioners from the events industry feeling that it placed undue emphasis on the involvement of Chartered Engineers and lacked practical guidance appropriate to the needs of the industry.

As a result of the negative feedback received the ISE revisited this work in 1997. While ISE again provided the Chair and Secretary (Sue Doran) for the committee, the membership was much broader, comprising stakeholders covering the full range of interests and situations. Participants' affiliations were published in the revised report, issued in 1999. This report, which again received government endorsement, met with a far more positive response, and has been widely adopted.

Following publication of the report the committee was reconstituted as the Advisory Group on Temporary Structures (AGOTS) to provide an ongoing pan-industry forum for monitoring experience of use of the guidance and developments in related areas. Although the Institution continues to provide the secretariat the Chairman is not a member of the Institution.

Stadia (2001)

Football stadia are licensed by Local Authorities, with support and advice from the Football Licensing Authority (FLA). As buildings, stadia fall within the scope of Building Regulations, for which DTLR is currently the lead Government Department. Government policy leadership for sports clubs and the FLA is provided by the Department of Culture, Media and Sport.

Following the debates on dynamic loading for demountable structures, the Football Stadia Development Commttee (FSDC) within DCMS, FLA and DTLR became concerned at the state of knowledge surrounding existing stadia. There were some clear gaps in this area between relevant British Standards, the Building Regulations , and the DCMS Guide to Safety at Sports Grounds (commonly known as the"Green Guide"). Stadia are increasingly being used for diverse events such as pop concerts, and it was felt that, although there had been no serious accidents to date because of dynamic loading, the issue was sufficiently serious to warrant an expert review. The FLA circulated a questionnaire to clubs asking them to identify principal natural frequencies of vibration, but the responses were of limited use as they were of widely different provenance

Being aware of the previous ISE work on demountable structures, DTLR and FLA approached the Institution in 1999 and asked if they would consider convening and leading a committee to review dynamic performance of stadia and how it should be assessed.

Having agreed to do this, ISE built on the experience gained through the two demountable structures committees over the previous several years. A broad church of interests and viewpoints was assembled, including people from the relevant regulators, sports clubs, design and engineering organisations, and the Building Research Establishment. The Chairman and Secretary (Sue Doran) devoted a large amount of time and effort to meeting the committee members and listening to their initial views and concerns.

It took about 6 months to build a strong working relationship and spirit of trust and mutual confidence among the committee. Some were initially sceptical of the value of the work, seeing it as interference. Others were worried that their committee colleagues might not respect the confidentiality of documents they tabled for discussion, or might use the Committee as a platform to advance their own interests. Throughout the work, a deliberate attempt has been made to ensure that differences of opinion are heard and discussed.

Typical contentious issues have included definition of what needs testing and how the tests should be performed, and getting an appropriate balance between strategies to make structures stronger, and strategies to manage the maximum dynamic loads imposed on the structures. This latter is a particularly interesting balance. Everyone expects an engineering oriented committee to recommend standards for structural engineering. But some people find it hard to deal with such a committee making what seem like restrictive non-technical recommendations (e.g. to avoid playing loud rock music at half time) at least in part because of the possible commercial implications to clubs. The Committee has tackled these differences through open debate and discussion, with the Chair and Secretary acting as "honest brokers" to facilitate a compromise where securing agreement had been particularly difficult.

The initial output will be a report, to be issued very shortly, giving interim guidance on the assessment approach to be applied to existing stadia. It is too early to judge what the outcome will be, but there are positive early indications in that several of the Committee members who were sceptical at the outset appear to have been won round to the value of securing agreement in this way.

The committee will continue to meet in order to produce further guidance in due course.

Summary Observations

Sue Doran feels that she and the ISE have learnt a lot about effective resolution of differences of technical opinion since she joined the Institution's staff 6 years ago, right at the end of the original demountable structures work. The main lessons are

1. Getting the composition of the Committee right – the aim is to build a consensus among the key stakeholders, so they and their different views need to be represented
2. Quality of leadership from the Chairman and secretariat is clearly a major issue. Sue Doran feels it has helped her enormously that, though not a specialist in dynamic loading *per se*, she is a highly qualified professional engineer, well able to follow the issues and hold her own in discussion with Committee members.
3. People and relationship issues – spending time with people and listening to their concerns was a very important early activity. Building trust and mutual confidence is a prerequisite for people with differing views to work together effectively.
4. Practicality of recommendations has been a major area of improvement since the first ISE report, effected in particular by the involvement of those who will have to implement them.

CASE STUDY – MATRIX SECURITIES LIMITED

The Organisation

Matrix Securities Ltd is an investment management company which offers a core "fund of funds" product range, and in addition specialises in developing innovative investment products. The respondent for this study was Rupert Lywood, the co-founder, Managing Director and proprietary shareholder in the company.

Nature of Decisions

Matrix relies on expert advice throughout its business, not least in its core "fund of funds" area where the company relies on various experts to help choose the funds in which it will invest. Our discussion for this study focused, though, on two in particular of the innovative investment products Matrix has developed:

1. A Docklands property investment scheme made attractive by the tax treatment of the construction costs sunk into properties which at the time had low market values, and
2. A scheme for investing in a portfolio of films which individually were very risky, but collectively were less so. This product was further de-risked for investors by buying very expensive insurance to take out the "down side", but leave investors with the entire "upside" of the performance of the films they backed.

The critical aspect of interest for this study was that the investments relied heavily for their attractiveness on the decisions of others to permit Matrix to put in place arrangement that de-risked the products for the investors. Matrix was thus heavily reliant on specialist advice both in developing those arrangements, and in securing the agreement of those involved to enable them to happen.

The Decision Makers and the Specialists

In the Docklands example, the key decision maker was the Inland Revenue. Matrix took extensive legal and tax advice before using Counsel to draft the letter seeking a ruling from the Inland Revenue that their proposals were acceptable. When the ruling given was later reversed and Matrix sued the Inland Revenue, extensive additional legal advice was taken. Rupert's own background is in accounting and merchant banking; he thus has strong financial expertise, which is complemented by considerable legal knowledge gained in the course of his work with Matrix and other companies.

In the insurance-protected film investment example the key decision makers were the insurance underwriters who accepted the very considerable downside risks of individual films failing to deliver the planned revenue. Matrix relied for advice and support on one of the top brokers for this kind of work, and also on creditworthiness advice in selecting underwriters with whom to work. The scheme has led to litigation, and further legal advice being sought.

Issues and How They Are Dealt With

The issues in these two examples are quite straightforward. In the first example, the Inland Revenue gave written acceptance of Matrix's understanding and interpretation of the tax treatment before the investment was marketed. Once the prospectus was produced

it too was submitted for confirmation of its accuracy with the Inland Revenue, and that confirmation was provided in writing. The Inland Revenue changed their mind, influenced in Rupert's view by heavy publicity the scheme received while the details were still being finalised, and eventually reversed their decision.

To resolve this very significant difference of opinion, Matrix sued for a judicial review, and in the course of several months appealed all the way to the House of Lords, where they lost their appeal on a 5:0 vote. Key aspects of this case in Rupert's view included:

- there was no hard "right" or "wrong" answer to the question of whether the scheme should or should not qualify for the tax status claimed
- the Inland Revenue was the sole arbiter, regardless of the consensus or otherwise among expert advisers whom Matrix had consulted
- the original confirmation was given by one part of the Inland Revenue, while the later concerns were raised by a quite different part of the organisation
- the reversal of opinion may well have been linked to concerns raised in the light of publicity with a "clever exploitation of a loophole" flavour
- Matrix used the QC who had originally drafted the letter to the Inland Revenue to lead their case in suing for judicial review. With hindsight Rupert feels it would have been more effective to have used a different barrister who could have provided a more objective opinion and approach.

In the film investment scheme, Matrix went to great lengths to de-risk the investment through insurance. For 65% of the insured value they chose underwriters with credit rated AA or higher by Standard & Poor, and BBB+ rated insurers for the other 35%. All went well until one or two films failed completely. It was clear at this stage that the underwriters' initial assessment of risk had been defective. Despite the huge premiums being charged, it required too many successful films to deliver enough premium income to make up for the number of flops experienced.

The underwriters have refused to pay out on the insurance, claiming fraud on the part of the broker who sold the scheme to them in the first place. The importance of proving fraud lies in the wording of the insurance policies, under which fraud provide the only possible grounds for non-payment. Matrix have thus embarked on litigation against the insurers to collect the unpaid claims. The insurers are joined in the action and are facing allegations of fraud from the underwriters. The total pending in claims for all the films insured in this way is approaching £1 billion; the individual films which are the subject of dispute typically involve claims at the £10-20 million level. The fraud "get out of jail free card" for the underwriters became available to underwriters after Matrix had commenced proceeding. This was as a result of a Court of Appeal reversal of a High Court ruling in a similar case. The High Court ruled that the policy wording was not effective as intended and the Court of Appeal ruled that it was "absent fraud". The Court of Appeal's findings are being appealed to the House of Lords, so the game could change yet again.

To make matters worse, the underwriters for 55% of the value of the insurance had by this stage gone bust, because of quite unrelated problems. It is not straightforward to work out what constitutes the best outcome of all this litigation for Matrix and their investors. If the broker is successful in defending against the fraud claims, then Matrix is left with 55% of the value of its claims placed with insolvent insurers. If the broker fails, then there will be

a further vitally important decision to be made by the Court as to the liability of the broker in respect of claims against the insolvent insurers.

The case here is a complex one, and Matrix changed their legal team at an early stage in order to avoid a potential conflict. Even when not fully happy with their legal advice they prefer to "run with" their advisers rather than risk a worse outcome by asking the legal experts to fight on a basis with which they do not agree.

Significant lessons from this case include:

- Expert advice can very quickly become invalidated by sea changes in the external environment (e.g. the creditworthiness ratings provided by S&P for insurers)
- In the commercial world, even arrangements which look black and white on paper can always be challenged, with the courts providing the ultimate resolution
- If a policy disagreement arises with the expert legal adviser, Matrix may change adviser but will usually maintain a united front for tactical reasons with whoever is their appointed adviser.

Summary Observations

The issues and examples discussed in this case study are commercial ones, in which right and wrong are established by agreements between the parties. Lessons Rupert has drawn from these experiences include

- Decisions based on the best expert advice and a high degree of consensus, delivered in a formal way, can be revisited and overturned quite quickly as circumstances change.
- As client for expert advice, he has to maintain a firm overall grip on strategy and policy issues.
- When differences do arise, it is sometimes better to look for an impartial second opinion than to rely on the proponent of one of the initial viewpoints.
- At the end of the day, decisions are made by people, who will always weigh many other factors alongside the quality of expert advice on specialist issues, even if those specialist issues are vitally important in determining the outcome.

CASE STUDY – OFFICE OF SCIENCE & TECHNOLOGY

The Organisation

The Office of Science and Technology (OST) is part of the Department of Trade and Industry. It provides the overall coordination, leadership and funding of research carried out through the Research Councils, and is headed by the Government's Chief Scientific Adviser. The respondents for this study were Judy Britton (Director, Science in Government) and Dr David Coles (Deputy Director, currently seconded to OST from the Department of Health).

OST Involvement in Decisions

Policy and regulation on specific issues are developed by the relevant government departments. OST has an important role in the development of overall government science policy, and in providing strategic leadership on science and its integration into public policy. The Chief Scientific Adviser from time to time issues guidance on the use of science by government departments. The most recent document (Guidelines 2000, on the use of scientific advice in policy making) was published in July 2000. A code of practice for scientific advisory committees has recently been published. OST contributed significantly to the Government's response to the Phillips report (of the Inquiry into BSE).

Important Issues and the OST Position

OST aims to identify and promote good practice in the integration of scientific advice into public policy. The documents mentioned above are all in the public domain. Some of the important issues in relation to the management of differences of expert opinion, and a precise of OST's guidance on them, are summarised below.

1. **Exposing differences of view**: The OST documents strongly urge Departments to expose differences of opinion by – appropriate selection of experts, openness in commissioning expert advice and making it public, and clear statement of remaining differences of opinion once attempts to forge a consensus view have been made.

2. **Openness about uncertainty:** OST strongly encourages clear and open statements about uncertainty, adopting the Phillips recommendation that Government should "treat people as adults" and let them be aware of imperfections and incompleteness of knowledge.

3. **In-House Expertise**: another of Phillips' recommendations is that Departments need to maintain quality expertise in-house to help frame questions put to specialist advisers, test and challenge the advice of expert committees, and help incorporate scientific advice into practical policy.

4. **Delineation of the Advice/Policy Boundary**: Framing of the questions for experts is extremely important. It is up to Departments to bring together the scientific advice with the other economic, ethical, social and other factors and to make policy on "What is the best overall course of action to take".

Summary Observations

OST offers no particular prescription as to how differences of opinion among experts might or should be resolved, and does not set out explicit expectations in this regard. It is clear, though, from the nature of the advice on science and policy promulgated by OST, that it regards it as important to acknowledge such differences where they exist. Differences of opinion should not be concealed or lost in efforts to achieve consensus on every issue.

CASE STUDY – IPMS/PROSPECT

Institute of Professionals, Managers and Specialists

The Organisation

The Institute of Managers, Professionals and Specialists is the Trade Union representing about 75,000 members, predominantly scientists, engineers and technologists in the civil service, research councils, and other organisations. Its traditionally civil service members have been distributed across a wide variety of public and private sector organisations by privatisation, outsourcing and various forms of public-private partnership. IPMS recently merged with another smaller trade union, organising electrical engineers, to become the 104,000 member union, Prospect. The respondent for this case study was Dr. Valerie Ellis, the Assistant General Secretary of Prospect, who herself has a social sciences and IPMS background.

Nature of Decisions

Members of IPMS are actively involved in virtually all the types of decision situation discussed elsewhere in this report. In HSE for example, IPMS membership spreads across people involved in specialist technical units providing policy advice, the organisations who grant permission to operate to railways, nuclear power stations and offshore operators, and the field operational division involved in inspection and enforcement activity. Much of our discussion focused on the role of specialists in helping develop policy, but most of the points raised are of more general relevance.

The Decision Makers and the Specialists

Decision makers themselves are sometimes technical people who are IPMS members, but this is generally not the case. More typically, senior decision makers in public sector organisations are generalists chosen for their breadth of capability rather than their in-depth expertise in a particular area. The prototypic role of an IPMS member is to work as a technical specialist, providing advice to support the work of, and decisions made or recommended by, generalists who do not share the IPMS member's domain expertise.

Issues and How They Are Dealt With

Many IPMS members who were involved in the Phillips Inquiry into BSE were very concerned at the position in which they had found themselves. Having been enjoined to openness, they were confronted with a court-like setting with legal experts involved on both sides. Several people felt that they were being forced to defend themselves against being made scapegoats for much wider organisational, political and cultural failures. Several of the people named in the Inquiry report were IPMS members.

Many others in Government shared IPMS' concern about the way in which specialist advice had been developed and specialists had been treated over the BSE issue. Senior scientist members of IPMS suggested to the union that they convene a conference to air the issues. The conference, "Oracles or Scapegoats", was held in October 1999 and attracted inputs from the Government Chief Scientist and many senior and influential Government people and technical experts. The principal suggestions put forward by participants to improve confidence in government and science were very relevant to this study:

- transparent policy-making processes backed by effective freedom of information
- robust procedures for disclosure, review and management of conflicts of interest
- multiple sources of information and expertise to reflect the full diversity of opinion
- more public funding of research in the public interest
- prior political definition of problems and assumptions
- scientists being prepared to be flexible and to engage in debate
- clear lines of accountability for decisions.

IPMS had contributed to, and welcomed, the guidance provided by the Chief Scientific Officer on the procurement and use of expert advice, and the developing guidelines for expert committees.

Responsibility and accountability for decisions is a major concern of IPMS. The more complex the issue, the greater the tendency for generalist decision makers to lean on specialist advice and shift the onus of decision making onto the specialists. IPMS members had seen this as a particular problem throughout the BSE experience. The problem becomes particularly acute if decisions turn out badly, and the decision makers try to wash their hands on the basis that "We did everything the scientists said".

Loss of specialist staff from the public sector is another persistent IPMS theme. The net effect of outsourcing, privatisation, and successive rounds of spending cuts has been significantly to deplete the stock of able scientific and technical staff in Government departments and agencies. A major theme in the "Oracles or Scapegoats?" conference was the importance of highly able technical staff in assisting non-specialist decision makers to frame the questions for, and interpret and apply the advice offered by, experts. IPMS regard the combination of rising recognition of the importance of the in-house "right hand technical person" for decision makers (for example in the secretariats to expert committees), with reductions in numbers of high calibre technical staff, as particularly worrying. The parallel tendency towards short term contracts is also an issue of concern, as it increases the possibilities for discontinuity and loss of important databases, particularly those held informally in people's heads.

The other IPMS concern surrounding commercialisation of technical support to government is conflict of interest. Successive governments have pursued vigorous policies of moving technical organisations and people from government departments into arms-length agencies, and in many cases moving such agencies into the private sector. IPMS do not have a dogmatic view that this is always a "bad thing", but are concerned that the very widespread adoption of this principle is creating increasing reliance for government on commercial organisations. Such organisations have many other pressures and interests than providing high calibre, unbiased advice to government.

Victimisation of members who dare to challenge established views is another area of active IPMS concern. Very often this is not because of any particular hostility from individuals with reputations to protect, but arises because of a more collective protective response from an organisation with a strongly established culture. Examples included the vet-dominated culture of MAFF in its early days, which made it difficult to consider alternative ideas about BSE or foot and mouth disease.

IPMS recognised that dealing with differences of opinion required their members, as specialists, to accept responsibility as well as the management and organisations for which they worked. A particular area of difficulty for many scientist members of IPMS was in accepting that science was inevitably framed in the context of values and judgements, and did not possess a unique "absolute" status.

There has been much talk when expert advice is discussed about building "firewalls" between decision makers and specialist advisers. IPMS would not wish to see this building divisions between specialists and decision makers. Their support for clear accountability for decisions does not imply that they do not believe specialists should get involved in the decision process. They would like to see more face to face discussion between generalists and specialists. Some of the most difficult decisions, in the face of greatest uncertainty, really need the generalists and specialists to work together actively to make the best possible decision.

Summary Observations

Valerie Ellis summarised her expectations of "generalist" decision makers and the specialists advising them as follows.

Decision Makers should:

1. Talk to close and trusted colleagues (preferably someone in their own team) who understands the technical domain to help them know where to look and how to start framing the issue and deciding what advice to ask from whom
2. Ensure some sort of "refereeing" function is in place for the selection of experts; a valuable general practice is to include intelligent non-specialists in the field in any group, to ask the basic common-sense questions which domain experts may overlook
3. Consult up-front about the decisions to be made and the issues involved – the Human Genetics Commission, the Food Standards Agency, and the Agriculture and Environment Biotechnology Commission were starting to provide examples of good practice in this respect. Clearly this is an area where practice will have to adapt to the time available – it will not always be possible for decisions to be made in a hurry.
4. Ensure the advice provided is well interpreted and applied to the decision in question. If the decision maker is not able to understand the issues and advice themselves, and the experts are not able to explain it satisfactorily to him or her, then it is vitally important to use an interpreter (typically an in-house technical colleague) to assist.

Specialists should:

1. Clarify and agree up front what they are being asked for
2. Be able to communicate, both to listen and understand the context in which their advice is sought, and to deliver it in terms that others can understand
3. Be prepared to express and discuss their own views, and open them to test and challenge
4. Be prepared to get involved alongside decision makers, and take some responsibility in the decision process, in return for enhanced status and recognition.

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