

<b>Meeting Date:</b>	7 February 2007	<b>FOI Status:</b>	
<b>Type of Paper:</b>	Above the line	<b>Paper File Ref:</b>	
<b>Exemptions:</b>	None		

**HEALTH AND SAFETY EXECUTIVE  
The HSE Board**

**HORIZON SCANNING: RESETTING THE RESOURCING FOR A HORIZON SCANNING  
SYSTEM COMMENSURATE WITH HSE'S FUTURE NEEDS WHILST CAPITALISING  
ON THE WORK TO DATE**

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2007**

**Issue**

1. Resetting the resourcing for a horizon scanning commitment commensurate with HSE's future needs, whilst capitalising fully on the outputs from this system to date.

**Timing**

2. For the February Board Meeting.

**Recommendation**

3. It is recommended that the Board:
  - a) Acknowledges the substantial achievements on horizon scanning; and
  - b) Agrees to a step change down in the commitment to undertaking horizon scanning whilst putting greater effort into ensuring that its outputs are effectively utilised; and
  - c) Accepts that CoSAS should provide the future intelligent customer role for this work; and
  - d) That HSE reviews its needs for horizon scanning again in five years time.

**Background**

4. In October 2004, the Board commissioned a co-ordinated horizon scanning system, incorporating a new, dedicated horizon scanning team located in the Health and Safety Laboratory (see Board Paper B/04/027 by clicking on the following link - [http://intranet/boards/hse\\_board/2004/papers/B027.pdf](http://intranet/boards/hse_board/2004/papers/B027.pdf)).
5. After some preliminary work in Corporate Science and Analytical Services Directorate (COSAS), Strategy Division (SD) took on provisional responsibility for establishing and promoting the system and its outputs.

6. An overview of developments to date, including a review of progress against the Board specification set out in B/04/027, is at Annex 1.

## Argument

7. The system has produced a number of notable products, including;
  - a) A substantive body of key emerging topics and crosscutting issues likely to be of significance to the HSC/E and others in the health and safety system – please see the HSE website for examples of the web materials on emerging topics ([www. http://www.hse.gov.uk/horizons/index.htm](http://www.hse.gov.uk/horizons/index.htm)); and
  - b) A suite of scenarios setting out possible futures for the world of work in 2017; and
  - c) A groundbreaking external workshop, well attended and positively received, to validate and explore these scenarios (see Annex 1, Appendix 3).
8. Given this substantive body of material and the scenarios, HSE now needs to move to fully capitalising on the intelligence emerging from its horizon scanning activities – and that there is an auditable trail that leads from the intelligence to health and safety outcomes. It is, therefore, proposed that SD organise a seminar for colleagues across HSE to present this emerging intelligence in key areas such as demographics and flexible working and employment patterns (for a full list of the issues see Appendix 2). This seminar would be a precursor to future proofing HSE’s forward plans.
9. Whilst making best use of what has currently been produced is crucially important, HSE now needs to consider its investment in horizon scanning - both in the current financial climate and in that now HSE has much of the social, economic and technological context for change that will be useful for the near future.
10. There are three options:
  - a. Leave the current system largely as it is;
  - b. Reset the resourcing to maintain a de minimis level of activity to ensure HSE stays abreast of developments likely to impact on its work;
  - c. Wind down the current investment and embed horizon scanning into the mainstream of the intelligence and/or knowledge management role of CoSAS.
11. Given how much has been achieved and given the current financial constraints, continuing as now is not recommended. The options therefore boil down to a care and maintenance role or a cessation. There are reputational risks associated with ceasing HSE’s activity in this area. External stakeholders have invested in HSE’s work in this area – OST for example provided the venue for the scenario workshop (see paragraph 7 c) – and there is a central expectation that HSE maintains a horizon scanning capacity. But HSE’s work to date is credible and if specific projects have to be commissioned in the future this can either be through the research budget or through our own specialist network (in either case bids for money would need to be made and justified both in terms of the intrinsic merits of any proposal and in terms of overall affordability). In addition, there is little or no potential to exploit the expertise and experience in HSL in this area on the commercial market. It is therefore, proposed to scale down the HSL commitment over 2007/08 at a rate to be agreed by the end of 2006/07 between CoSAS and HSL, in line with the recent agreement at the HSE/HSL Partnership Board about avoiding abrupt adjustments to HSL’s workload.
12. At the same time as making this change in resource commitment, it is also proposed to ask CoSAS, with their agreement, to take on the corporate intelligent customer role. This role would dovetail well with its existing responsibilities and capabilities. And

would chime well with the emerging thinking from the Making Better Use of Science workstream from the Fundamental Review.

13. And finally, it is recommended that HSE's needs for horizon scanning – in terms of both content and capability – be reviewed again in five years time.

### Consultation

14. HSL, PEFD and COSAS.

### Presentation

15. No significant presentational issues identified.

### Costs and Benefits

16. The total budget for the HSL team is £1, 675, 404 to cover the period 1 January 2005 to 31 March 2008. Expenditure to the end of December 2006 was £918, 979. The year on year spend is as follows.

Year	Original profile (£)	Actual spend (£)
2004/05	58, 180	34,368
2005/06	517,734	486,444
2006/07	538,688	398,167 (to end Dec 06). Projected 530,000 to end March 2007
2007/08	560, 802	428,000 (projected)

17. The original staffing plan provided for one Band 2, four Band 3s (currently 3 in post) and a half time Band 6. Actual staffing levels have been and are:

Month/Year	Staff in post
Jan-April 2005	Band 2
May 2005	Band 2, Band 3
June 2005	Band 2, Band 3 x 2
July 2005-Dec 2006	Band 2, Band 3 x 4 (1 x 0.5 Band 6 Jan – May 2006 only)
January 2007 -	Band 2, Band 3 x 3

18. CoSAS and HSL will agree with PEFD the financial impact of the Board's decision on the S&T budget and the HSL income and expenditure account for 2007/08.
19. Resource implications for Strategy Division in establishing, maintaining and promoting the system and its outputs reached a high immediately prior to the successful external workshop, with 0.75 x 1 Band 2 and 1 x Band 3. This has since been scaled back, with agreement to divert 0.75 of the Band 2 resource into other priority work within Policy Group (this Band 2 post was not affected by the Policy Group affordable staffing plan). The remaining 0.25 of the Band 2 post will be used to manage the transition of the work from SD to CoSAS. The Band 3 post will move to CoSAS – the primary role to maximise the return on the current investment through utilisation of the information and scenarios.

### **Financial/Resource Implications for HSE**

20. See above.

### **Environmental Implications**

21. None

### **Other Implications**

22. None

### **Action**

23. SD, COSAS and HSL to ensure the necessary steps are taken to enact the recommendations.

## **ANNEX 1**

### **Horizon scanning in HSE: an overview**

#### **Background**

1. Horizon scanning was established to:
  - d) Inform strategic thinking, planning and target setting, including the development of future strategies and priorities;
  - e) Identify possible changes of direction and emphasis for strategic programmes; and
  - f) Assist in the formulation and delivery of strategic programmes.
2. HSE has a good record of involvement in horizon scanning specific topics, such as nanotechnology, to anticipate early their impact on occupational health and safety. However, a stocktake of this work in 2004 – driven by wider Government concerns that Departments and Agencies were not conducting effective and meaningful horizon scanning - concluded that existent arrangements were not fit for purpose and that a more strategic, systematic approach was needed.
3. In consequence, the HSE Board commissioned in October 2004 a horizon scanning system (ref B/04/027). Appendix 1 illustrates the process as envisioned in July 2005. Considering the HSE structures within this, the Risk Policy Unit role has been replaced by Strategic Intelligence Unit and the Resources Delivery Group disbanded.
4. Scrutiny of the process is provided by the Horizon Scanning Intelligence Group (HSIG), which includes external members from Local Authorities, Other Government Departments and industry. Accountability for delivery is found in the line management chains of the Horizon Scanning Team, and Strategic Intelligence Unit.

#### **Current Position**

5. The core function of scanning for changes and developments in social context and technology that impact upon the workplace progresses well, with both external and internal interest in the outputs. The horizon scanning website features a significant number of 'hot topics', that are regularly added to and refreshed. Topics are prioritised for attention using a model designed in-house to ensure that resources are targeted and used effectively.<sup>1</sup> Reports are presented to the HSIG to an agreed format and are published on the website. A selection of issues currently within the horizon scanning system is at Appendix 2.
6. The system has developed a positive, and growing, external profile. A recent review by the Office of Science and Innovation described the system as robust and Sir

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<sup>1</sup> Issues are prioritised using the Prioritisation Assessment Model (PAM). This was developed in-house, and utilises a systematic question set to derive, using a numerical weighting, objective conclusions from the subjective assessments that inevitably surround horizon scanning topics.

David King, the Government's Chief Scientific Adviser, has written to Peter Buckley, Chair of HSIG, expressing his regard for HSE's approach to and delivery of horizon scanning activities. A horizon scanning workshop, hosted by HSE on 30 November 2006 in partnership with OSI and chaired by Jonathan Rees, was well attended by delegates from a very wide diversity of organisations. Feedback from the event has been very positive, indicating that HSE has consolidated and strengthened its position as an organisation in the vanguard of Government horizon scanning activities (see Appendix 3).

7. The input the HSL team has received from HSE groups and the Advisory Committees (ACs) has proven to be variable. Some groups have been proactive and developed their own processes, with support and involvement from the HSL team, e.g. Process Safety, Human Factors, Occupational Hygiene and some are currently developing them e.g. Biological Agents. In addition, working relationships have been established with the Agricultural sector, Manufacturing, Construction and Public Services and radiation specialists. The position for the ACs is less good, with only the Working Group for the Assessment of Toxic Chemicals (WATCH) sub committee of the Advisory Committee on Toxic Substances (ACTS) proactively engaging in horizon scanning activity.

8. The HSL team and the wider horizon scanning group appreciate that the recent uncertainty over the position of S&T in HSE may have negatively impacted on the horizon scanning activities of groups in the organisation; also that there are lessons to be learnt for the HSL team in better engaging with others in HSE, recognising that a more sustained and proactive approach is probably required. A period of re-engagement with HSE groups and ACs will begin in the New Year.

9. The horizon scanning process has demonstrated the required strong links to other key areas in HSE. For programmes, for example, the close attention from horizon scanning to the priority area of demographic change has provided collaborative working opportunities with Fit 3, Cross Cutting Interventions Division, the Health Work and Wellbeing strategy team, the 'where and how we work' project; with Operational Development Managers, in respect of identifying the impact of such change upon the future training needs of inspectors; and with Major Hazards Strategic Programme Board. A further paper on demographic change has recently been circulated to Board members, intended to explore HSE's strategic positioning in respect of this issue

#### **Review of progress against Board specification (ref. B/04/027) at Jan 2007**

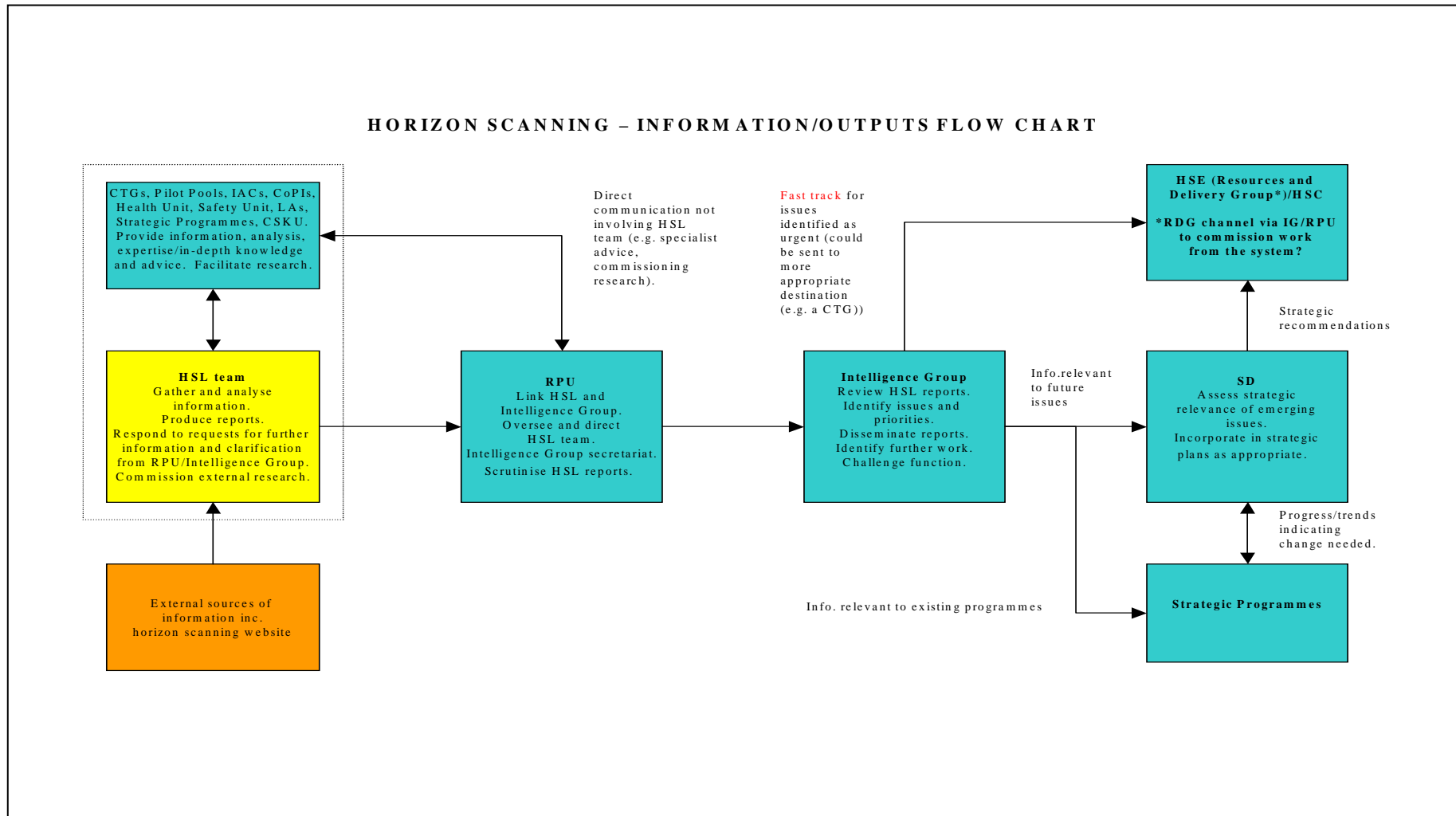
10. Positive progress against the Board specification can be summarised as follows;
- a) The system has produced a shortlist of key emerging topics and crosscutting issues likely to be of significance to the HSC/E and others in the health and safety system. Significant issues are taken to be those with the potential to present significant new or changed work-based risks (challenges and opportunities) over the medium to long term.
  - b) The system has delivered a suite of web materials, position papers and short form reports on the key topics and issues, a set of 'world of work in 2017' scenarios and run a groundbreaking and successful external workshop to validate the scenarios and initiate thinking on their various implications.
  - c) The system continuously reviews and refreshes the shortlist and papers.

- d) The system has a very wide perspective, encompassing developments in science and technology; the workplace and working practices; socio-economic trends which affect the labour market; trends in public attitude towards risks; the UK political agenda, including major policy developments by OGDs; the European Union; and international developments (globalisation).
- e) The system enables an improved understanding of the health and safety implications of cross-government activities (e.g. Foresight programmes) that could impact on work related health and safety.
- f) The outputs from the system are informed by a wide range of stakeholders (internal and external) and are increasingly being made openly available through web materials, meetings and conferences.
- g) The system has supported a growing competence and acquisition of important new skills e.g. scenario development, in the HSL based horizon scanning team and in forging influential links with DTI/OSI.
- h) The system has enhanced HSE's reputation as a innovative, leading player in Whitehall horizon scanning activities.

11. Shortfalls in progress are;

- a) Horizon scanning has yet to make any serious impact on what HSE and others are doing or plan to do, either at the programme level or more strategically. While this may in part be associated with the marketing of outputs from the system, the bigger problem is with the development of the intelligent customer role.
- b) Experience across Government, and industry, suggests that the customer base for forward intelligence needs to be carefully nurtured. There are lessons to be learnt for horizon scanning in ensuring that this base is reached effectively - it may be that customers do not know what they are missing until it is explained to them in their own terms and context. This needs to happen appropriately at a senior management level in HSE as well as at each of the other tiers of management.

## Appendix 1 - A flow diagram of the HSE horizon scanning process as envisaged in 2005



## **Appendix 2**

### Demographic change

Demographic changes influence issues such as who is at work, where they are working and the jobs that they do. The HSE Horizon Scanning team has produced a comprehensive report on existing trends and, where they exist, predictions of future trends. The areas covered include population, ageing, gender, workforce by sector and occupation, ethnicity and migration, working patterns, housing/living patterns and the shape of industry.

Strategy Division has led on work exploring the implications for HSE and others of demographic change, and in developing actions to meet this challenge. A report will go to HSE Board in early 2007.

### Nanotechnology

Nanotechnology involves the design and manufacture of materials on the “nano” scale (i.e. at sizes down to 1 billionth of a metre) and is seen as having massive potential for application in a wide range of areas.

Advances enabled by nanotechnologies are predicted in fields as diverse as health and medical systems, energy and materials.

### Recycling

A significant expansion in recycling activities is anticipated. Waste Watch UK has estimated that up to 45,000 extra jobs will be created in the industry if the government is to meet its target of recycling 25-30% of municipal waste alone, by 2010. Recycling can expose workers to numerous risks, including transport hazards, manual handling, biohazards, toxic chemicals and plant.

### Human performance enhancement

This is the science of artificially enhancing the performance of the human body. The pace of advancement in nanotechnology, biotechnology, information technology, and cognitive science, using technologies including:

- Bionics (exoskeletons, arms, hands, eyes, some controlled by thought);
- Body or brain implants (Laboratory-grown or artificial hearts, lungs etc.);
- Brain implanted chips to control computers and robotic arms;
- Cognitive enhancing drugs to improve concentration, memory, wakefulness and decision making;
- Genomics: gene therapy, stem cells, xenotransplantation, ageing studies;

suggests that we are in the early stages of a new period in human technological potential.

### Pervasive Computing

This describes the concept of integrating computers into the environment in such a way as to enable people to interact with them more “naturally”.

Expected developments in pervasive computing include devices that sense changes in their environment and act on these changes, through to work on human-computer interactions and artificial intelligence.

Pervasive computing may significantly affect the way work is carried out. There may be safety benefits; however, there may also be an impact on worker's wellbeing from the effect of potentially much-increased monitoring.

### The Hydrogen Economy

The "Hydrogen Economy" involves the transformation of a primary energy source to generate hydrogen to feed Fuel Cells, which in turn provide power for a range of stationary or vehicle applications. Plans are in hand to build the world's first industrial scale hydrogen power generation plant in Scotland and prototype hydrogen/fuel cell powered buses are already operate in London.

Hydrogen has been produced and used in industry for many years, but wider usage in vehicles and domestic situations may bring new risks associated with the distribution, local storage and use.

### Cyber Security

Attacks on IT systems are commonplace but are to date mostly carried out for reasons of mischief or monetary gain. However similar threats exist to industrial process safety from breaches in safety critical control systems.

The increasing use of common, open operating systems, combined with wireless networking and greater inter-connectivity may make interference with control systems, either deliberately or accidentally, more likely.

### Carbon Dioxide Sequestration

The reduction of CO<sub>2</sub> emissions is of major environmental importance in combating global warming. One option to achieve this is to capture the gas at the point of generation and then to store the gas underground. The first proposal for the use of such a process in the UK is part of the plan for a proposed power station in Scotland.

Safety and health concerns associated with carbon dioxide capture arise from the use of pipelines not specifically designed for the purpose, the compression and venting processes and the handling of and exposure to the by-products from the extraction of carbon dioxide from waste streams.

### Obesity

The UK is experiencing a rapid growth in obesity, brought on by the increasing consumption of high calorie foods and reduced levels of exercise.

Apart from the general health risks, for example cardiovascular problems, increased levels of diabetes and musculoskeletal disorders, there are also implications for workplace risk, for example in use of equipment, seating, additional health risks from strenuous work activity and fatigue.

## Genetic Testing

Genetic tests for susceptibility to occupational illness are being developed, although they are not yet thought to be accurate or reliable enough to predict whether an individual is at risk.

Genetic testing may identify people most at risk from hazardous exposures or sudden illness. Yet it may too generate complex social and ethical dilemmas concerning who may or may not be employed in certain occupations.

## New and Emerging Pests and Diseases

New “pests”, in the form of flora and fauna or diseases (human or animal), which were previously rare or unknown in the UK, could appear as a result of external factors such as climate change and globalisation (specifically, increasing migration and movement of people, livestock and food products).

The prevalence of water-related illnesses and a wide range of food-, insect- and animal-borne diseases could all increase. New pests could present a health risk to those exposed by their work and an indirect consequence could be the introduction of new pesticides or new uses of existing pesticides.

## Biotechnology

The large-scale exploitation of micro-organisms to produce pharmaceuticals, feedstuffs or other valuable metabolites, including:

- *Gene Therapy*: Has the potential to treat inherited disorders, cancer and some genetic diseases.
- *RNAi*: Gene silencing technology potential to treat genetic disease
- *Biopharming*: the use of genetically transformed crop plants and livestock animals to produce valuable compounds, especially pharmaceuticals.
- *Synthetic Biology*: The re-writing of the genetic code of DNA to create or recreate microorganisms from scratch.
- *Stem Cells*: therapies to treat disease

Health and safety concerns include the use of infectious viruses as gene delivery systems (potential for spread to workers and the wider community) and that certain drugs produced by plants are known allergens, presenting a risk to workers harvesting genetically modified crops.

## Terahertz Technology

Terahertz radiation (THz) is in a region of the electromagnetic spectrum between the Infrared and Microwave frequency ranges.

THz radiation can penetrate a wide range of materials that open up a variety of commercial opportunities, of which security and medical imaging applications offer perhaps the greatest potential. Being non-ionising (unlike X-rays for example), it is not

expected to damage DNA, although relatively little appears to be known definitively about the possible health & safety implications of exposure to THz radiation.

### Robots and Artificial Intelligence

More sophisticated pre-programmed robots have been developed that have greater dexterity and flexibility and are able to perform more complex tasks.

There is a future potential for robots to act as assistants to workers and so in closer proximity to workers – who will not be accustomed to interacting with and operating robots. Robots may potentially be able to undertake tasks such as manual handling, office work, industrial cleaning and construction and to act as hospital assistants.

### Flexible working and employment patterns

Work is becoming increasingly flexible, with growing numbers of people teleworking (working from other locations using the home as a base or working from home), working part-time and shift working. Employment patterns are also changing, with greater use of short-term contracts, temporary workers, and the self-employed. It is suggested that by 2015, 70-80% of workers could be, at least partially, working from a remote location.

Increased adoption of flexible work and employment patterns may also pose potential challenges for health and safety, including monitoring the health and safety of increasing numbers of workers using remote (and changing) locations, ensuring accurate reporting of accidents and ill-health among workers with flexible or precarious work/employment patterns, and ensuring that methods for preventing and managing risks for workers whose work location is not fixed are effective.

### Do Keyboards have a future?

The number of employees spending a large proportion of their time using ICT seems likely to increase; and keyboard work is one of the most commonly cited causes of work-related MSDs, reported by 14% of those affected.

Alternative designs to the standard keyboard have been available for some time; typically aimed at improving hand and wrist postures. Other developments include voice-recognition software, virtual (laser projected) keyboards, and tablet PCs (allowing input with a stylus or digital pen). Alternatives to non-keyboard input devices (i.e. mice) include touch screens and 'gestural' technology (using gloves with reflective beads and infrared cameras to detect motion).

## Appendix 3

### **Summary of feedback from Horizon Scanning workshop, held at DTI Conference Centre on 30 November 2006.**

HSE's first Horizon Scanning Workshop – 'Horizon scanning: health and safety in the changing workplace' was held on 30 November 2006, in association with the Office of Science and Innovation. Its objectives can be summarised as follows:

- Secure wider stakeholder participation in the horizon scanning system, thus validating it further
- Raise stakeholder awareness of both horizon scanning and the need to prepare for the challenges of the future
- Forge links with other scanners, obtaining additional leverage for the occupational health and safety agenda in this area
- Identify overlapping agendas between participants

37 of the 100 delegates attended provided feedback, key findings including:

- For 40% of respondents, this was their first introduction to horizon scanning.
- 86% of respondents stated that they intended to engage in horizon scanning activities in the future.
- 75% of respondents recorded that they had learned something new about Horizon Scanning as an activity
- All respondents found the HSE 'world of work in 2017' scenarios thought provoking, to varying extents, while over 80% felt they would be useful to their organisation.
- 80% requested further contact with HSE horizon scanning activities.

## ANNEX 2

The horizon scanning workshop examined four scenarios of what the world of work might look like in 2017 and through focus groups identified the following cross-cutting themes with particular relevance to forward business planning and prioritisation:

Education – informing and preparing the next generation of stakeholders about emerging risks, sensible risk management and communicating risks: in an environment where public attitudes to risk and responsibility may have altered radically as issues such as climate change impact more and more on the individual.

Role and nature of regulation – reviewing the regulatory framework and assessing its adequacy for controlling the fast changing and inadequately understood risks in the changing workplace.

Crossovers and blurring – not just between, for example, occupational health, public health and common health issues, but between the work and the home; between health, safety and environment issues; between national and local priorities for health and safety; between privacy and monitoring at work; and between national security and personal liberty considerations.

Division and competition – not just between the haves and have nots, but between national and local priorities, large and small organisation priorities, work and home, technological advances and morality/ethics (for instance, with reference to the employment of those who may be genetically predisposed to certain occupational diseases, or in biotechnologies).

Continuing links to wellbeing – building upon the ‘good jobs, good health’ agenda, developing Health Work and Wellbeing, in an environment of changing demographics, flexible and/or precarious working and shifting employment patterns and increased workplace monitoring (whether for productivity or health reasons).