



Ministry of Defence

MINISTRY OF DEFENCE

DEFENCE ENVIRONMENT AND SAFETY BOARD

SAFETY, ENVIRONMENT AND SCIENTIFIC RISK

REPORT 2007

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EXECUTIVE SUMMARY

1. There is no major change to the most significant Safety and Environment risks to Defence shown in the 2006 DESB Report. At TLB level and below and within the Trading Fund Agencies, action plans have led to some encouraging improvements in a number of areas of concern which have, in turn, uncovered other areas where action is required. Note that Sustainable Development is no longer covered in this report.
2. There has been improvement across the Department in demonstrating leadership and commitment to Safety and Environmental Protection (S&EP) but the risk to reputation and to compliance, particularly in light of the forthcoming Corporate Manslaughter legislation, still remains significant.
3. Several areas of work are having a positive influence on improving the ability to measure and monitor our performance in S&EP management. However, a lack of leading performance indicators and independent evidence means that a clear picture of assurance does not emerge. Although End-to-End assurance will produce improvement, this is not yet in place throughout the Department.
4. There has been a 13% fall in fatalities attributable to Road Traffic Accidents (RTAs) in 2007. The bulk of this problem is in the Army who have undertaken the most noteworthy activities towards reductions in this area. RTAs, both on and off duty, remain a significant cause for concern.
5. The impact of organisational change on safety management arrangements, including problems with recruitment, retention and career development of Suitably Qualified and Experienced Personnel (SQEP), is being felt to varying degrees across the Department. This remains a cause for concern and there has been little improvement.
6. Failure to assess and manage land contamination has the potential to impact on defence activities through reducing the availability of training areas, limiting development of the estate, reducing disposal receipts and diversion of funding to meet statutory clean-up obligations. In order to clarify the extent of any problems and to enable costed solutions to be found DE has initiated a data collection exercise.
7. The condition of some parts of the MOD estate continues to give cause for concern with the potential to impact on operational capability as well as to cause environmental contamination; specifically, the condition of the explosives and fuel storage facilities are highlighted. Inevitably, there are associated cost impacts. There has been little improvement on last year.
8. Many contributors continue to express concerns over the failure to learn and communicate lessons from accidents/incidents, leading sometimes to a repetition. Introduction of the new Incident Recording and Information System Project (IRIS) in Jan 08 will help, but as yet there is no significant improvement in this risk from last year.

9. There have been major efforts, in particular by DE, to improve the implementation of Control, Coordination, Communication and Cooperation (4Cs) policy with contractors. However, the position remains inconsistent across the estate as demonstrated by audit results, and the current overall assessment is that there is only limited compliance..
10. The MOD Aviation Regulatory and Safety Board (MARSB) continue to report that aircraft and their crews (particularly helicopters) are at risk in high tempo operational theatres due to pressures arising from the enduring nature of these tasks and the level of resources available to support them. The delay to the provision of Collision Warning Systems (CWS) and lack of wire strike protection for helicopters also continue to provide significant risk.
11. The quality of reports from duty holders and Functional Safety Boards (FSBs) continues to improve, though clarity over roles and responsibilities of FSBs remains a challenge to the provision of effective assurance. The receipt of 2 Crown Censures in 2007, reflecting incidents in 2003 and 2004, along with the requirement for improved interfaces and End-to-End assurance, highlights deficiencies which we are starting to put right. We are becoming more aware of what we have to do in terms of understanding the extent of the risks but the heightened awareness, reflected in better reporting of accidents and incidents, has produced an apparent worsening in performance in some areas.
12. The lack of sufficient evidence on which to base the assessment of assurance is itself a weakness. Providing an overall assurance assessment is, therefore, particularly difficult this year. Actions are in hand to make improvements in many areas of concern but at the present time the DESB assess that management of S&EP is at Significant Weakness.
13. For its priorities in 2008, the DESB:
- a. Agreed that an assurance strategy should be produced to clearly articulate the relationship between Functional Safety Boards and TLBs, reporting requirements for the DESB, and principles of End to End assurance.
 - b. Agreed that the following should be mandated across the Department: coherent procedures for sharing lessons learned from accidents and incidents; communication of good practice; and, accident investigation by appropriately trained personnel.
 - c. Agreed that existing work underway in DE&S, under the Safety Improvement Working Group, should seek to clarify safety interfaces between DE&S and FLCs/PJHQ. Once identified, the necessary processes should be put in place, as appropriate, by FSBs and TLBs.

- d. Agreed that, resource requirements for S&EP should be coordinated to enable identification and incorporation in the Planning Round.
- e. Agreed that a framework for performance measurement should be developed, particularly including leading Key Performance Indicators.
- f. Agreed that the use of IRIS should be mandated across the Department, with exceptions to be agreed by DS&C only where it can be demonstrated that they provide more effective and appropriate measures.
- g. Agreed that DS&C should initiate follow on work from the DMCS report on Major Hazard Accident Response Arrangements, including improvements in independent scrutiny.
- h. Agreed that the benefits of development programmes for SQEP, covering recruiting, training and career management, should be examined.
- i. Agreed the proposed audit programme, designed to contribute towards verification of the effectiveness of management processes in place for safety and environmental protection. A functional audit on the impact of organisational change on safety management (including Streamlining) should be included.
- j. Agreed that DS&C should conduct a review of top level safety governance.

It is intended that these priorities should be incorporated into a DESB action plan, and the DESB be updated on progress at 6 monthly intervals.

INTRODUCTION

1. The DESB Annual Report covering calendar year 2007 provides assurance on the extent to which the Department is achieving effective Safety and Environmental Protection (S&EP). Areas of specific concern are highlighted by identifying common themes and risks. It encompasses contributions from the Duty Holders responsible for implementing safety and environmental policy and standards, and from the Chairs of the Functional Safety Boards (FSBs). These contributions form an audit trail for the conclusions in this report, which itself necessarily includes only limited detail.
2. Reporting is risk-based, with the risks discussed and agreed by a Risk Tracking Group (RTG) consisting of stakeholder representatives from the Duty Holders (including Trading Fund Agencies), FSBs, and Scientific Risk. The RTG has met three times in the past year, developing and refining the risk evaluation process to allow a better analysis of the risks.
3. Organisational changes in the past year have led to slight revisions to the list of contributors to this report. The report from Defence Equipment & Support (DE&S) replaces previous inputs from Defence Logistics Organisation (DLO) and the Defence Procurement Agency (DPA); the report from MOD Aviation Regulatory and Safety Board (MARSB) replaces previous inputs from the Defence Air Safety Board (DASB).
4. Contributors have set out in detail the following for their area: Risks; Performance (including Fatalities, Trends in Accidents and Incidents, Pollution Incidents, Crown Censures, Improvement and Prohibition Notices received and implementation of Environmental Management Systems (EMS)); Progress and Successes; and, Audit Findings. The reports conclude with an assurance assessment for each area and set out priorities for the coming year. These reports are available at: [Duty Holder/FSB inputs 2007](#).
5. Duty Holders, in their role as risk owners, have a responsibility to address risks relevant to their area. Departmental issues formed from the aggregation of TLB risks have the potential to lack critical detail. However, the most significant risks/issues to Defence objectives, assessed through the RTG process, are as follows:
 - Leadership/Commitment to S&EP
 - S&EP management systems weaknesses
 - Road Traffic Accidents
 - Lack of suitably qualified and experienced personnel
 - Land contamination
 - Infrastructure
 - Failure to learn from accidents/incidents
 - Poor implementation of 4Cs¹ policy
 - Increased operational pressures resulting in air accidents

¹ Control, Coordination, Communication and Cooperation.

6. Complexity precludes a consolidated 'traffic light' depiction of each risk/issue, therefore a narrative indication of change against last year is made in this report. An assurance assessment for the Department is given, with a recommendation of priorities for DESB action in 2008.

PROGRESS MADE AGAINST RISKS/ISSUES

- **Leadership/Commitment to Safety & Environmental Protection**

7. There has been much good work across the Department in this area which shows major improvement on last year. However, the risk to reputation and to compliance, particularly in the light of the forthcoming Corporate Manslaughter legislation, still remains significant. Successes and actions vary across the Department; examples include:

a. During 2006 the creation of the single naval TLB and the Transformation programme of 2007 provided an opportunity to revisit safety and environment (S&E) management process across the naval service using Lean methodology. This resulted in the creation of the Fleet Operating Authority and greater senior management oversight through Deputy Commander-in-Chief Fleet's monthly Fleet Delivery Group. The Navy Board have participated in a safety workshop.

b. Senior Army Boards have this year undertaken safety training conducted by CESO(A) and a major review has been carried out into the degree of compliance with H&S law, prompted by the introduction of the Corporate Manslaughter and Corporate Homicide Act 2007. CESO(A) reports on safety performance now at every 4* and 3* Command Board each quarter.

c. Air Command has been briefed at both 4* and 3* Board level on the implications of the Corporate Manslaughter legislation. This has resulted in a review by the 3* Command Delivery Group of the organisation and arrangements for safety management across Air Command. As a consequence, strengthened arrangements are now being put in place for Board-level oversight and direction of safety, environmental protection and sustainable development (SHEP&SD), including an overarching reporting framework across all the functional safety areas, with a quarterly review by the Command Delivery Group. The Command Board, supported by both the Command Delivery Group and the Air Audit Committee, will review safety performance and assurance biannually. An Aviation Safety Management Plan has been endorsed by CinC; and a similar, complementary plan covering off the detailed arrangements for (ground) safety, environmental protection and sustainable development will be developed in due course. Senior officers' Directives are being amended to reflect their responsibilities for SHEP&SD accordingly

d. CJO Directives now include safety responsibilities. This is a first and key step in establishing safety assurance in operational areas.

8. Other areas have also taken the initiative to brief their management boards and senior staff. Furthermore, briefings are to take place in early 2008 to individual Defence Board members as well as the Board itself in April 08, in order to demonstrably reinforce leadership in health and safety at that level.

- **Safety & EP Management Systems Weaknesses**

9. Although there have been significant efforts to improve S&EP management systems, this work has itself exposed further areas of concern such as interfaces between FSBs and TLBs. Other areas of concern include:

a. the Defence Ordnance Safety Board (DOSB) reports concern that existing arrangements are unable to provide adequate safety assurance of ordnance/explosives deployed on operations. Concerns emerged last year regarding OME safety on operations, largely centred on Op HERRICK and relating to multinational munitions storage and handling safety. They included the reporting and handling of munitions incidents, especially during extended operations away from bases, and the issue of and compliance with limited safety clearances for UOR systems and some munitions natures. In order to identify and mitigate these potential risks, PJHQ has become a full DOSB member and implemented its own munitions safety board;

b. Concern that Urgent Operational Requirements (UORs) have not always covered the requirement for training, potentially impacting on operational safety.

The Strategic Gap Analysis² identified high level organisation and arrangements and performance monitoring as two key areas of system weakness. Examples of work to address these is outlined in the following 2 paragraphs.

10. 2nd PUS endorsement of the paper on Strategic Organisation and Arrangements for Safety Across Defence³ has prompted changes in the role of the FSBs. An example is that, because of these influences, the thrust of the Ship Safety Board's (SSB) assurance activities has changed from a focus on IPTs to an End-to-End focus on the integration of functions across the maritime domain. That said, it is of concern that End-to-End assurance is not yet in place throughout the Department. Work is underway to produce an assurance strategy by Spring 08, which will clarify the relationship between FSBs and TLBs. This is a key priority for 2008.

11. Dstl report accident potential as well as actual occurrences, thereby increasing their "near miss" reporting, and DE&S have set up a Safety

² DESB P(07)2

³ D/VCDS&2PUS/9/4/1 LM dated 2 Apr 07, Strategic Organisation and Arrangements for Safety Across Defence.

Improvement Working Group to look at strategic lessons from recent major accident Boards of Inquiry. These activities, together with other action within TLBs/TFAs, have had a positive influence on improving our ability to measure and monitor the performance of S&EP management systems. Nevertheless, more needs to be done to develop leading performance indicators, and this will form a key priority for 2008.

- **Road Traffic Accidents (RTAs)**

12. Data⁴ for Service deaths attributable to RTAs in 2007 shows a 13% fall, from 61 in 2006 to 53 in 2007. However, RTAs remain a significant cause for concern. DESB members should note that the bulk of this problem is in the Army who have undertaken the most noteworthy activities towards reductions in this area. Data for 2006 (shown in Table 1, below) shows that RTAs accounted for 32% of all Service deaths, compared to 33% the previous year.

Table 1. Summary of Defence Road Traffic Accident Statistics 2006⁵

	2005	2006	% Change	5 Yr Average	% Change
Road Traffic Accidents	7,781	6,918	-11.1%	8,032	-4.59%
RTA rate per 100K miles	2.36	2.51	+6.35%	2.28	+1.3%
Fatalities On-Duty	11	9	-18.19%	13	0%
Fatalities Off-Duty	41	52	+26.83%	47	+2.17%
On-Duty Injuries Serious	58	47	-18.97%	66	-5.72%
On-Duty Injuries Slight	471	396	-15.93%	595	-10.26%
Actual Costs of Insurance Claims	£12.95M	£10.9M	-15.83%	£10.79M	+6.72%
Estimated Cost of MOD Vehicle Repairs	£4.88M	£4.92M	+0.82%	£5.55M	-0.54%
Estimated Total Losses ⁶	£142.80M	£126.56M	-11.37%	£130.78M	+4.19M

13. Aside from Defence Road Management Committees, HQ Land has continued to actively pursue solutions to reduce RTAs, including targeted radio and TV advertisements, and road safety campaigns throughout the year. A major campaign has been launched by CESO(A) to raise the awareness of soldiers returning from Ops. A series of TV and radio commercials were recorded in Summer 2007 and broadcast on BFBS TV and radio to troops in the final weeks of their op tours to raise awareness of the fact that British troops are twice as likely to die on the road as civilians. During Decompression, a hard-hitting DVD drama depicts a soldier returning from R&R and eventually being killed in an RTA ("The Grim Reaper") and a series of posters, constantly refreshed to keep the campaign alive on return to barracks.

⁴ Source: Defence Movement Transport Policy Division.

⁵ JSP 485 Edition 2006.

⁶ Estimated losses are calculated using a formula developed on behalf of the Health and Safety Executive. These recognise that the true accident costs are between 8 and 36 times the known costs. To avoid exaggeration, these losses are calculated by multiplying known insurance claims and estimated repair cost by a factor of 8. Therefore, this should be seen as the minimum level of loss to the defence budget.

14. The campaigns have been widely acclaimed, but it is too early to see significant changes. In addition, a Motor Insurance package is being developed to incentivise good driving but dis-incentivise poor driving. Further campaigns are planned for 2008, subject to funding.

- **Lack of Suitably Qualified and Experienced Personnel**

15. The impact of organisational change on safety management arrangements, including retention of Suitably Qualified and Experienced Personnel (SQEP), is being felt to varying degrees across the Department and there has been little improvement in this area from last year. The Secretary of State's Policy Statement⁷ requires assessments to be carried out prior to any significant organisational change to confirm that environmental and safety management is not degraded. However, change initiatives across the Department continue to compete with necessary consolidation activity for scarce safety SQEP resource.

16. Reports this year reflect concerns and include work towards mitigation by the Army, the Defence Nuclear Environment and Safety Board (DNESB), DE&S and the DOSB.

a. The progress of the Corporate Manslaughter and Corporate Homicide Act 2007 through parliament prompted the Army to undertake a review of safety compliance. A major uplift in resources for safety management (Safety Advisers in Arms & Services Directorates, at formation level and in 87 units) has been endorsed by CinC Land personally for implementation in 2008 at a cost of £6.1M.

b. DNESB report that the continued availability of sufficient nuclear suitably qualified and experienced personnel (NSQEP), both for MOD itself and for defence contractors, is one of the greatest challenges to the sustainable future of the defence nuclear programmes in the medium term. At present MOD has an underbearing of nearly 10% of civilian NSQEP posts. But there have been some encouraging developments in 2007. DE&S corporately has recognised that upskilling is key to its future success, which has provided a welcome framework. Director General Submarines (DGSM) has refined his analysis of the demand and supply of NSQEP staff, both safety professionals and engineers. Most importantly, he has gained corporate funding and approval for the annual recruitment of 22 graduates and 22 technicians (advanced modern apprenticeships) and for their initial nuclear training, and, further, for a training margin of 6 posts to allow mid career development.

c. To assist Directors General in the recently formed DE&S to manage safety and environmental issues within their new clusters, and to support the Chiefs of Materiel in their task, the S&EP Directorate has

⁷ Safety, Health and Environmental Protection in the Ministry of Defence, dated 19 Dec 06.

introduced a team of qualified Safety and Environmental Liaison Officers, to provide a corporate focus within the clusters and help drive improvement.

d. The DOSB report inadequate assurance of Ordnance, Explosives and Munitions (OME) competence. The requirement to ensure there are sufficient personnel entering the MoD OME community, including at the lowest local industrial levels, is the subject of work within the DE&S and needs to remain dynamic in the context of evolutions within DSDA. Work to map current MoD OME competencies to National Occupational Standards is also ongoing, to ensure that MoD personnel, particularly in the industrial grades, are appropriately qualified, as well as experienced.

18. The DESB feel that the challenge of recruiting, training and managing SQEP might be better delivered through the formalisation of a development programme. Priorities for action in 2008 will include a functional audit on the impact of organisational change (including Streamlining) on safety management.

- **Land Contamination**

19. Failure to assess and manage land contamination has the potential to impact on defence activities through reducing the availability of training areas, limiting development of the estate, reducing disposal receipts and diversion of funding to meet statutory clean-up obligations. Land quality assessments carried out to date have not identified the wide spread presence of contamination on the defence estate. However, in order to give greater assurance on this point, DE has initiated a data collection exercise to clarify the extent of any problems and to enable costed solutions to be found.

20. There are some specific issues that may lead to calls upon defence resources:

a. Contamination from the use of ordnance on the training estate: Work in North America has identified potential environmental risks from OME used in training. An initial scoping study carried out by DE DTE indicates that the risk is very low, but further investigations will be carried out to provide greater assurance.

b. Disposal of ammunition and pyrotechnics within general waste: DE DTE has had a number of incidents where ammunition and pyrotechnics have been disposed of as general waste. No serious incident has occurred to date but there is a risk of injury to contractors. A successful pilot project for waste separation has been carried out at Otterburn and the lessons are being rolled out to other ranges.

c. Unexploded Ordnance (UXO): UXO presents a significant risk of injury to trainees, contractors, tenants and members of the public. Risk assessment and mitigation measures are in place but the limited

availability of EOD resources is a handicap and may lead to restrictions on access to and use of parts of the defence estate.

d. Chemical Warfare (CW) agent legacy: Residual traces of (CW) agent have been found on sites formerly used for CW agent storage and disposal at the end of WWII. DE has initiated Project Cleansweep to quantify the risks: 46 sites have been identified for investigation, of which 33 are no longer under MOD control.

- **Infrastructure**

21. There have been initiatives in this area but, to date, insufficient mitigation action to change the level of risk from last year. DESB members expressed concern that the condition of some aspects of the MOD estate, notably fuel and explosive storage facilities, has the potential to impact on operational capability. There is, inevitably, a cost impact.

22. The DOSB reports on mitigation actions designed to address further deterioration in the explosives estate. The project to provide a Compliant Explosives Facility (North) (CEF(N)) is unlikely to reach the IAB by Spring 08, as the option study is still being populated, and is now planned for Oct 08. Funding has been agreed at £124 M although allocations in year may change due to resourcing pressures across MOD. This could compress the build programme but is not expected to delay the project beyond its 2014 completion date.

23. Following identification of the poor condition of Longtown/Eastriggs, DE conducted a further assessment of the remainder of the OME estate, the findings of which have yet to be fully assessed and costed. It is likely that further investment will be required in sites such as Kineton in order to ensure OME safety and to safeguard operational capability in the medium term.

24. The Army again reports concern that failure to maintain sea defences at Lydd could lead to the reduction in size or loss of a major training facility. The Environment Agency are preparing a consultation document as part of the Coastline Management Plan that proposes the current forward line of sea defence at Lydd Ranges should be maintained. Other than possible objections relating to potential damage of the site (which has multiple designations) as a result of the work undertaken, this proposal is likely to gain local approval as it will provide protection for the Romney Marshes. The possibility that MOD might be invited to contribute to the cost of the forward defence strategy cannot be ruled out. The situation will be kept under review

- **Failure to Learn from Accidents/Incidents**

25. Contributors continue to express concerns over the failure to learn and communicate lessons from accidents/incidents, leading sometimes to a repetition. More needs to be done, particularly in the light of Crown Censures and the Corporate Manslaughter and Corporate Homicide Act 2007, to ensure lessons are learnt from accidents/incidents and from good practice in specific

areas of the Department. Furthermore, inputs indicate concern over the robustness and consistency of accident investigation processes, particularly in their ability to identify root causes. Work to address this will form a priority for 2008.

26. As of Jan 08, the Incident Recording and Information System Project (IRIS) has replaced the Ministry of Defence's ageing accident and incident recording and claims handling databases, CHASP and RAPID respectively. IRIS will significantly enhance the Department's ability to record, learn and share data and knowledge, and will enable claims handling to be directly linked to the causal event record and follow-up investigation. IRIS will collect data on direct costs of accidents/incidents and indirect costs (such as equipment losses, recovery and repair, retraining and medical treatment) which are often less clear but no less a threat to defence capability. The DESB agreed that the use of IRIS should be mandated across the Department, with exceptions to be agreed by DS&C only where it can be proven that these provide more effective and appropriate measures

- **Poor Implementation of 4Cs Policy**

27. There have been major efforts to improve the implementation of 4Cs policy. DE has been at the forefront of this improvement programme, with delivery of awareness events to over 550 MOD personnel and contractors. Nevertheless, overall, the position remains inconsistent across the estate as demonstrated by variable audit conclusions, and the current overall assessment is that there is only limited compliance. A further series of workshops, focussed on individual TLBs, will be rolled out through 2008.

- **Increased Operational Pressures Resulting in Air Accidents**

28. MARSB continue to report that aircraft and their crews are at risk in high tempo operational theatres due to pressures arising from the enduring nature of these tasks and the level of resources available to support them. Higher accident rates⁸ would inevitably lead to the loss of high value aviation assets, affecting operational capability. The recommendations from an in-depth study into helicopter accidents on operations are being addressed – there is a strong read-across to fixed wing ops and the DESB should note that the findings point to a requirement for a re-examination of the level of resources required.

29. The provision of Collision Warning Systems (CWS) has suffered delays for technical and financial reasons and the MARSB considers it important that, both for functional and presentational perspectives, this capability should be put in place as soon as possible. In addition, despite increased training, wire strikes continue to present a significant hazard to helicopter crews with

⁸ The headline aircraft accident rate, measured as a 3 year rolling average of accidents causing damage either not repairable on site (or using the equipment/facilities on site), beyond economic repair, or the aircraft is missing, has increased from 0.16 to 0.18 per 10,000 flying hours.

resultant impact on this scarce resource; investigations into wire strike protection for military helicopters is ongoing.

DISCUSSION OF OTHER RISKS

Scientific Risk

30. Key risks identified by Science Innovation and Technology (SIT) to Safety, Health and Environmental Management are shown at Annex A.

Low Probability/High Consequence Risks

31. The complexity of the Department's business activities can itself present a hazard, and care needs to be taken to identify any accumulation of reductions in control measures which could lead to increased risk. In general, the DNESB, MARSB and the DOSB provide assurance that high consequence risks, such as those associated with nuclear safety, explosives and fuel safety and aviation safety are being well managed. However, there is no room for complacency, and infrastructure, especially for fuel and explosives storage sites, must be adequately resourced. Furthermore, rigorous scrutiny and oversight of our management of high consequence risks must continue to develop, and the management system would benefit from benchmarking and independent challenge in some areas.

32. A recent DMCS report⁹ included the following recommendations: to introduce independent scrutiny of all investigations into major accidents across all the major hazard environments; to introduce a safety improvement plan for the Defence Board (DB); and, to compare MACR¹⁰ against COMAH¹¹ Regulations. Clearly, risk assurance processes in place for these areas need to be of the very best and follow on work from this report will be initiated by DS&C.

High Probability/Low Consequence Risks

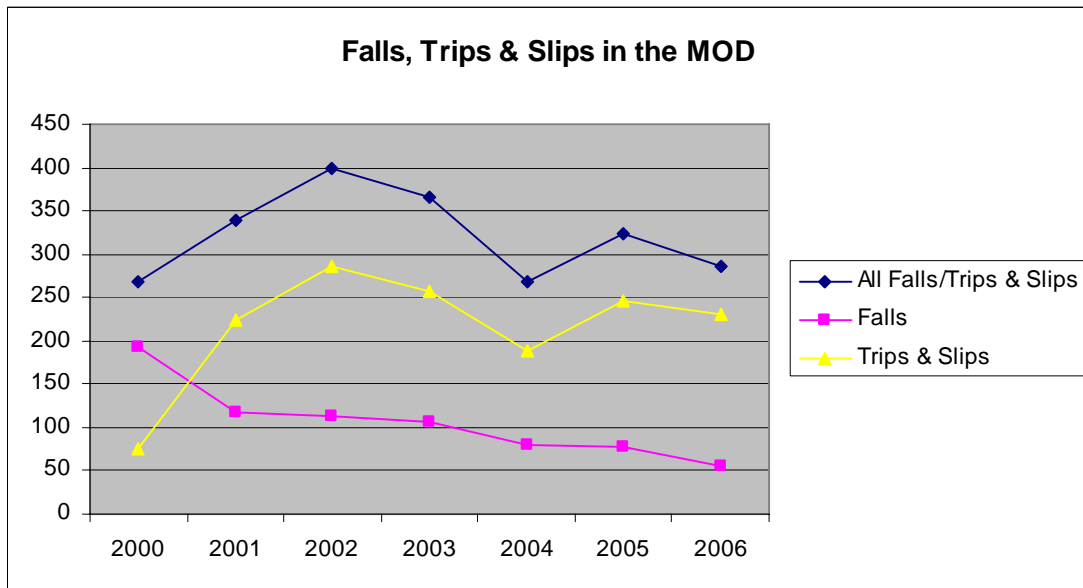
33. Figures provided by Claims for low consequence risks (Falls, Trips and Slips) show a summary of the numbers for Service and civilian personnel in Figure 1 (below). The trend shows a slow decline from a peak in 2002.

⁹ A Review of Major Hazard Accident Response Arrangements in the Ministry of Defence, dated 25 Jan 08.

¹⁰ Major Accident Control Regulations (MACR).

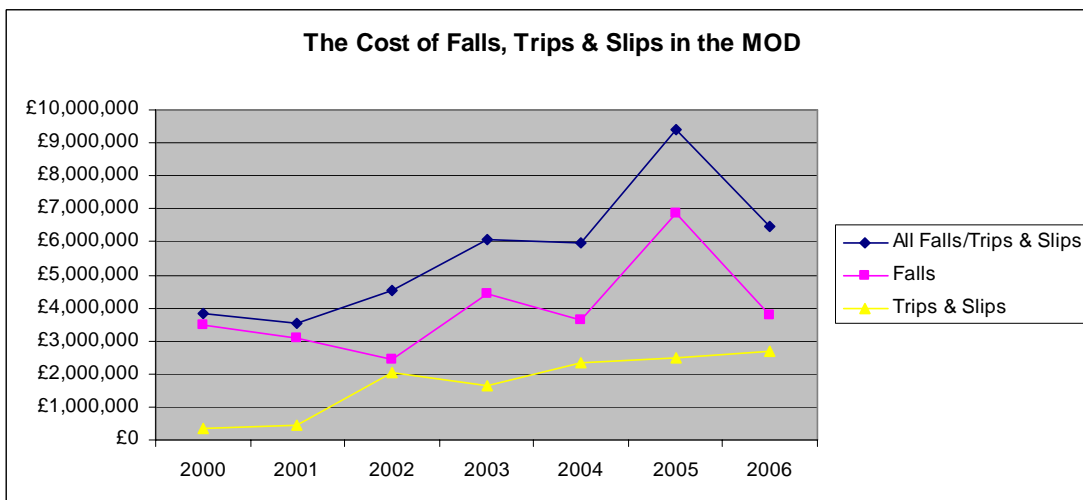
¹¹ Control of Major Accident Hazards (COMAH).

Figure 1. Summary of Department-wide figures for Falls, Trips and Slips



34. The cost to the Department of these low consequence risks, in terms of compensation paid, continues to rise and is summarised in Figure 2 (below).

Figure 2. Summary of the cost of Department-wide Falls, Trips and Slips



35. The financial cost is only part of the burden to the MOD as data for associated absence has not been readily available. DS&C will investigate whether HRMS can be used to capture the cost of absence in the case of civilians. To help reduce the incidence of such low consequence accidents, particularly amongst civilian personnel, MOD ran its own version of the HSE's 'Watch Your Step' from August to October in 2007. Service personnel and contractors are also important audiences and were targeted where appropriate and practicable to do so. The campaign ran alongside the other current HSE campaigns such as 'falls from vehicles' and 'lighten the load', and TLBs were advised that they may find it helpful to incorporate messages

from the falls from 'vehicles' campaign if it helps to reach their intended audience.

Crown Censures

36. Two Crown Censures were taken by the Department in 2007, reflecting Health & Safety incidents in 2003 and 2004. A summary, together with Improvement and Prohibition Notices, is at Annex B.

Pollution Incidents

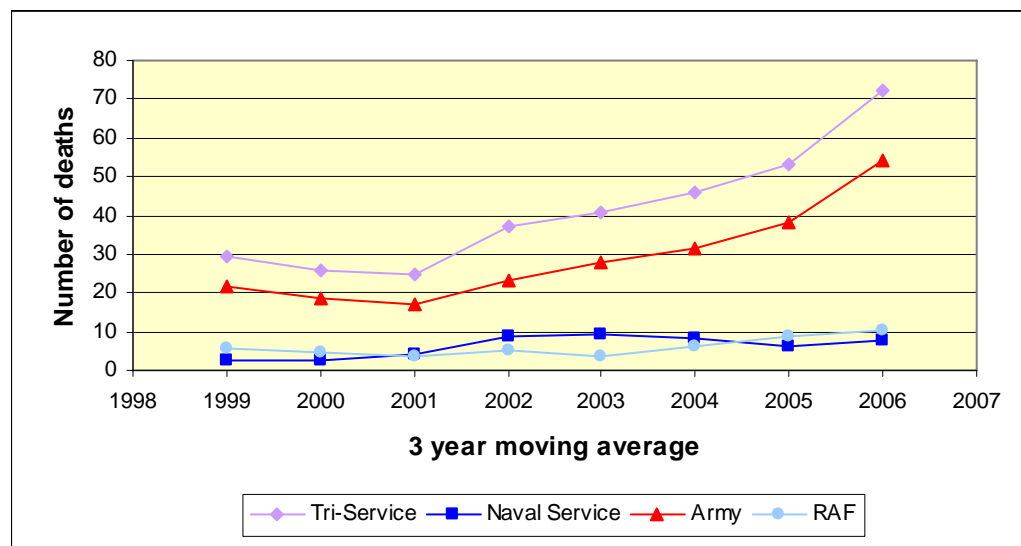
37. No Environment Agency Enforcement Notices were received this year. A summary of pollution incidents is included at Annex B.

PERFORMANCE

Fatalities

38. Data from DASA up to the end of 2007¹² for injury-related, on-duty fatalities is shown in Figure 3 (below). Also shown below are a breakdown of these fatalities on deployed operations (Figure 4) and excluding deployed operations (Figure 5). All Figures include RTAs. (Note: the graphs show 3 year averages, not annual figures.)

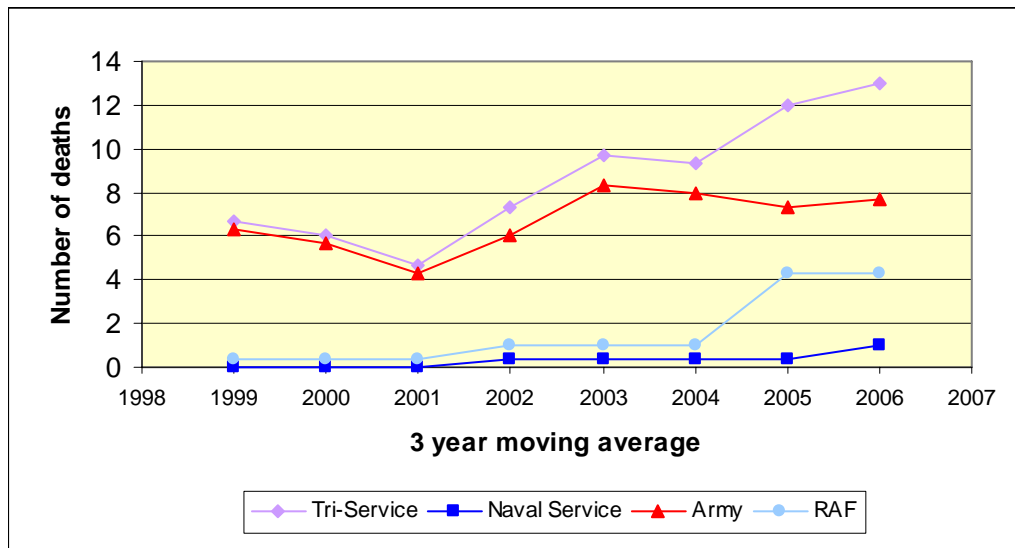
Figure 3: Number of injury-related deaths, on-duty, excluding suicide and open verdicts (3 year moving average)



Note that data for Figure 3 includes 86 combat deaths in 2007, whereas for Figures 4 and 5 only data for non-combat deaths is used.

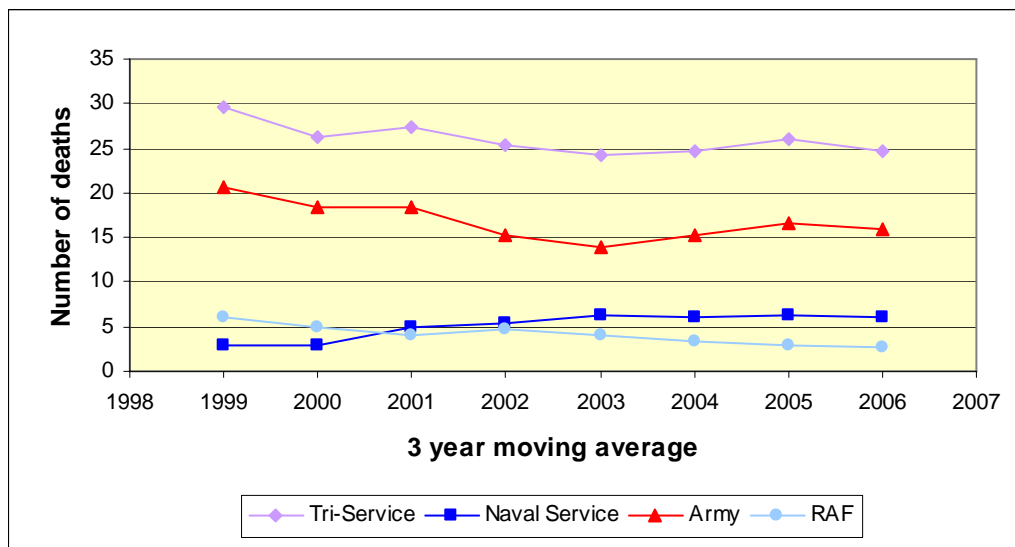
¹² Data for 2007 has not yet been validated. The fully validated data will be available from 31 Mar 07 when DASA publish the National Statistic release 'Deaths in the UK Regular Armed Forces, 2007'.

Figure 4: Number of non-combat deaths, on duty, on deployed operations (3 year moving average)



The general upward trend in Figure 4 is due to a variety of causes, including the Nimrod crash in 2006.

Figure 5: Number of deaths, on duty, excluding operational deployments (3 year moving average)



The number of on-duty deaths outside of operational deployments, although now less than the 1999 figure, remains steady.

Suicides

39. The number¹³ of suicides and open verdicts recorded for Regular Service personnel in 2007 was 3, although a total of a further 10 are awaiting

¹³ Source: DASA.

verdict. If confirmed, this figure would represent a slight reduction from the 4 recorded in 2006.

ASSURANCE SUMMARY

40. Quality of reports from duty holders and FSBs continues to improve with clarity over roles and responsibilities of FSBs remaining the biggest challenge to the provision of effective assurance. Progress has been made in defining the requirement of 'independent, evidence-based end-to-end assurance' but more work is required on an over-arching assurance strategy.

41. The DESB noted that impact that media interest can have on safety matters. The issuing of two Crown Censures on MOD by the Health & Safety Executive in Mar 07, and latterly the publication in Dec 07 of the Board of Inquiry into the loss of Nimrod MR2 XV230, caused the Board of DE&S to reconsider and revisit its assessment of risk in 2007. The effect of these events, reinforced by the findings of the Buncefield Standards Task Group report¹⁴, the Baker Report¹⁵ and confirmation of the details of creation of a criminal offence of Corporate Manslaughter, has been to sensitise the DE&S Board to the necessity of validation of policy and verification of its implementation. Robust and independent assurance is required, delivering value through challenge where possible.

42. The majority of contributors report Substantial Assurance of effective management of health and safety risks, and compliance with health and safety management systems. Environmental management remains less well developed in most areas. However, it is clear that visibility of safety and environmental issues at senior management level has improved over the past 12 months. Furthermore, across the Department there is greater awareness and understanding of the extent of the risks. But the result of this heightened awareness, particularly in the area of accident reporting, is reflected in an apparent worsening in performance in some areas.

43. Providing an overall Assurance assessment has proved particularly difficult this year. Improved awareness is bringing to the fore a number of areas of systemic weakness (detailed in this year's report) which are manifest in some areas more than others. Following discussions, the decision was right on the cusp between Minor and Significant Weakness and the DESB has agreed¹⁶ that, overall, the management of S&EP is at:

SIGNIFICANT WEAKNESS

44. Annex C sets out the audit programme for the next 3 years.

¹⁴ HSE Report: 12th October 2006

¹⁵ BP U.S. Refineries Independent Safety Review Panel (the "Baker Report") January 2007.

¹⁶ Satisfactory – Performance on Target; Minor Weakness – Small Variation from Target; Significant Weakness – Significant Variation from Target; Critical Weakness – Major Variation from Target.

PRIORITIES FOR 2008

45. For its priorities in 2008, the DESB:
- a. Agreed that an assurance strategy should be produced to clearly articulate the relationship between Functional Safety Boards and TLBs, reporting requirements for the DESB, and principles of End to End assurance.
 - b. Agreed that the following should be mandated across the Department: coherent procedures for sharing lessons learned from accidents and incidents; communication of good practice; and, accident investigation by appropriately trained personnel.
 - c. Agreed that existing work underway in DE&S, under the Safety Improvement Working Group, should seek to clarify safety interfaces between DE&S and FLCs/PJHQ. Once identified, the necessary processes should be put in place, as appropriate, by FSBs and TLBs.
 - d. Agreed that, resource requirements for S&EP should be coordinated to enable identification and incorporation in the Planning Round.
 - e. Agreed that a framework for performance measurement should be developed, particularly including leading Key Performance Indicators.
 - f. Agreed that the use of IRIS should be mandated across the Department, with exceptions to be agreed by DS&C only where it can be demonstrated that they provide more effective and appropriate measures.
 - g. Agreed that DS&C should initiate follow on work from the DMCS report on Major Hazard Accident Response Arrangements, including improvements in independent scrutiny.
 - h. Agreed that the benefits of development programmes for SQEP, covering recruiting, training and career management, should be examined.
 - i. Agreed the proposed audit programme, designed to contribute towards verification of the effectiveness of management processes in place for safety and environmental protection. A functional audit on the impact of organisational change on safety management (including Streamlining) should be included.
 - j. Agreed that DS&C should conduct a review of top level safety governance.

It is intended that these priorities should be incorporated into a DESB action plan, and the DESB be updated on progress at 6 monthly intervals.

SCIENTIFIC RISK

1. Scientific Risks highlighted to the DESB by the Scientific Risk Management Team from SIT are set out below.
2. Tungsten Alloys.
 - a. The major ongoing risk relates to the use of tungsten alloy munitions in penetrating weapons. Tiny fragments of one particular alloy caused aggressive cancers in rats with 100% incidence and mortality. DU had no significant effect on the same rats. Embedded fragments can be expected in significant numbers of individuals after a land battle between armoured units (such weapons are generally only used against armour). Such fragments are impractical, probably impossible, to remove.
 - b. Although one other alloy does not show the effect, the big uncertainty at present relates to which other similar alloys would perform in the same manner. At our urging, DE&S is testing an alternative to the one munition that would have used the *identical* alloy in the short term. A similar alloy is used in GOALKEEPER (although the risk of exposure is substantially lower). Of most immediate concern is a related alloy which will be used in the RARDEN cannon on current plans. It is almost certainly too late to avoid any deployment at all if capability is to be maintained. We are recommending that an alternative is developed and tested now. The decision to commit to *manufacture* the new formulation can then be made once this work is complete, by which time it should be clearer whether the change is necessary. This course of action would however require DE&S to find additional funds for development now.
 - c. The overall research programme in this area is well-linked with the US programme and should help inform which alloys are a problem as well as how to treat injured personnel should such alloys be used against us. The US has recommended that their programmes do not use the specific alloy in future.
3. Nanotechnology. A key growing concern is that knowledge of the potential toxicology of nanomaterials is not keeping pace with advances in the field of nanotechnology. We have been tracking this for some years, and have commissioned some work that has led DSTL to develop their capability to address key enabling factors (e.g. containment of experimental particles, risk assessments) required to support future assessments. However the field is enormous (and varied; not all applications will be of concern). IPTs need to understand that there may need to invest more in understanding safety and

toxicology if they are developing applications based on nanotechnology and that the techniques for safety assessment could be ground-breaking (and hence slower and more expensive than usual).

4. Wind farms. Although the UK was one of the first Nations to identify the potential risk to Defence interests from windfarms and DE Safeguarding have coordinated a variety of studies into their effect on Air Traffic and Air Defence radars and seismic stations, there has recently been additional strong pressure for a large expansion in UK windfarms which could prejudice our systems. We are pleased to note the planned operational analysis study that should further increase the strength of our analytical position, and past trials have identified some key issues, however at present there is no technical solution to the problem, and procedural solutions (e.g. choice of location) are limited. This is work against the known problems, but there remains the risk of unexpected extra problems. It would seem that substantial extra work will be required to address this issue and the DESB may wish to support this. The generic concern about 'encroachment' from environmental legislation and related constraints (such as the issues with sonars highlighted last year) remains valid and SIT will assist D S&C in their planned work on all encroachments.

5. The scientific risk team will continue to track these and similar issues.

CROWN CENSURES, IMPROVEMENT NOTICES, PROHIBITIONS AND POLLUTION INCIDENTS - 2007

Crown Censures¹

1. Two Crown Censures were served on the Ministry of Defence in 2007 regarding incidents that occurred at Teesport in 2003 and Albemarle Barracks in 2004. Each incident resulted in the death of a serviceman.
 - a. May 2003. Whilst commanding the unloading of armoured vehicles from a semi low loader a second vehicle rolled and crushed a soldier between the two. He later died in hospital from his injuries.
 - b. May 2004. After washing a Multi Launch Rocket System (MRLS) vehicle a soldier went to dry his clothes on the exhaust vent. The MRLS was put into high revs and as the power engaged the vehicle lurched forward rapidly and unexpectedly collided with a forklift truck. The soldier was trapped between the towing bracket of the forklift and a load bashed on the MRLS. He later died in hospital from his injuries.
2. By the time the Censures were issued, the identified failings had been addressed and procedures and processes revised. Lessons learnt from the investigation of these incidents by MOD and HSE have been incorporated into current working practices to avoid similar occurrences. The actions taken by MOD were agreed by the HSE as sufficient to prevent a reoccurrence and improve general safety.

Crown Improvement Notices²

3. One Crown Improvement Notice was served during this period: on Landmarc (DTE), issued on 4 Jul 07.

Crown Prohibitions³

4. No Crown Prohibitions were reported during this period.
5. However, Defence Fuels Group, as independent Fuels Licensing Authority, served an extra-ordinary Prohibition Notice on King's Lines Fuel Depot (KLFD), Gibraltar. When the Prohibition Notice was served, the Command had already taken the decision to cease all operations at KLFD and also stop both MOD personnel and/or contractors from accessing or

¹ An administrative procedure, whereby HSE may summon a Crown employer to be censured for a breach of the Health and Safety at Work Act, or a subordinate regulation, which, but for Crown Immunity, would have led to prosecution with a realistic prospect of a conviction.

² Served by HSE when it is assessed that relevant statutory provisions are being contravened.

³ Served by HSE when it is assessed that an activity will give rise to the risk of serious injury.

carrying out routine operations at the fuel installation. The contractor is still undertaking those activities required to minimise the risk from the de-fuelled depot.

Enforcement Notices⁴

6. Two Environment Agency (EA) Enforcement Notices were served during this period, both on Air Command against RAF Marham:
 - a. Emissions from the Paint Facility not permitted. The Unit did not hold a LAPC permit for VOC emissions. Although a permit has now been granted by the Local Authority, at a cost of £2500 and £1k annual subsistence charge, the station disputes whether it was a legal requirement and CESO(RAF) are now advising.
 - b. Discharge Consent for Station Sewage Treatment Works exceeded. Although a consent has been issued, it is a Project Aquatrine responsibility and hence was passed to the Aquatrine Service Provider, C2C.

Pollution Incidents⁵

7. FLEET reported the following pollution incidents:
 - a. Marine Forty-six discharges were reported in breach of MARPOL Regulations, compared with 39 in 2006, an increase in accident rate of 18%. However, the total volume of pollutants was only 4061 litres compared with 13,247 litres reported for the same period in 2006. The spillage of F76 fuel fell to 772 litres from 897 litres in 2006, excluding the 2 large spillages of 9,200 litres last year. The 2 largest separate spillages were 1000 litres of hydraulic oil from a defective cooler on HMS ILLUSTRIOUS and 1000 litres of sewage on HMS KENT because of an incorrect system line-up. There has been a 58% increase in the number of reported release of Montreal Protocol gases to 54; of these 51 were attributable to equipment failure.
 - b. Land There have 18 Tier 1 incidents and 3 Tier 2 incidents during the reporting period, one of which was a release of raw sewage at RNAS YEOVILTON and has been investigated by the Environment Agency, because of shortcomings identified in the service provider's management system.

⁴ The purpose of enforcement is to: ensure that duty holders take action to deal immediately with risks; promote and achieve sustained compliance with the law; ensure that duty holders who breach health and safety requirements, and directors or managers who fail in their responsibilities, are held to account.

⁵ **JSP 317 Definitions:**

TIER 1: Where the clean up is entirely within the unit's capability.

TIER 2: The clean up requires assistance from another Service unit, or from an external organisation.

TIER 3: A Catastrophic Incident requiring major external assistance.

8. The Army recorded 45 environmental incidents this year attributable to Army activity. None were considered to be in the major category. There were 37 Tier 1, and 8 Tier 2 incidents. Six of the Tier 2 incidents occurred in UKSC(G) where assistance by the DFS raised the category from Tier 1 to Tier 2.

9. Air Command reported 105 Tier 1, 13 Tier 2 and zero Tier 3 pollution incidents. It should be noted that 23% of total spills reported were as a result of aircraft venting. Other pollution incidents/issues:

a. A pollution incident occurred at RAF Brize Norton when an Oil Interceptor on a neighbouring scrap yard failed. Although the Station was not at fault, it fell to them to manage and fund the remediation works which are still on-going.

b. Although CESO(RAF) has written to Station's reiterating the requirement, under JSP 317, for all spills to be reported to DFG, it is thought that many spills are still not being reported. RAF Stations have ordered enough fuel absorbents to clean up approx 10 times the volume of fuel that has been reported in Spill Reps.

10. CJO reported the following 3 pollution incidents in 2007 (compared to 2 in 2006, though they resulted in a smaller cumulative discharge), all occurred in the Falklands Islands Base (FIB):

a. 1 x 200ltrs estimated uncontrolled fuel loss over 4 week period from main AVTR over land pipeline by Main Gate. Small pin prick hole in underground pipe work identified and repaired. Area dammed and PCA used to remove fuel until repair completed.

b. 1 x 1000ltrs estimated uncontrolled fuel release of F76 to rear of PSD pump room. Gasket seal failed on isolation valve joint. Quick reaction by PSD staff reduced environmental impact. 90% of fuel recovered area already on contaminated ground register and monitored.

c. 5 x <30ltrs in volume total. Minor spillages of vehicle/aircraft hydraulic oil. No trends identified.

11. DE&S reported 64 Tier 1, 11 Tier 2 and zero Tier 3 spillages.

AUDIT PROGRAMME

TLB/TFA Audits.

FY 08/09	FY 09/10	FY 10/11
DSG ¹	Dstl	DE&S
DE&S ²	FLEET	Air Command
CJO ³	CTLB	Met Office
LAND	DE	
SIT		
UKHO		

This S&EP programme reflects revised working arrangements of combined audits with Security Risk Management and Business Continuity.

Functional Audits in FY08/09.

- Best Practice Review of Accident Investigation.
- Impact of Organisational Change on Safety Management, including recruitment, management and retention of SQEPs.

Follow-up Reviews in FY 08/09

- DE&S (6 month Review).
- ABRO/DARA (6 month Review).
- Met Office (6 month Review).
- Air Command (6 month Review).

¹ Formerly ABRO/DARA.

² Slipped from 07/08.

³ The scope of this audit will seek to include systems for safety in operational areas.