DESB P(06)1 Final

MINISTRY OF DEFENCE

DEFENCE ENVIRONMENT AND SAFETY BOARD

REPORT ON SAFETY AND ENVIRONMENTAL PERFORMANCE APR-DEC2005

HEADLINE ISSUES

1. The Defence Environment and Safety Board should note that:

   a. systems and processes for safety and environmental management are in place, though implementation has been better in some places than others. Overall, the Department's performance is judged to be generally satisfactory.

   b. the safety and environmental risks within the Department and the proposed remedial action;

   c. auditing and performance review constitute the 'feedback loop' which enables an organisation to reinforce, maintain and develop its ability to reduce risks and to ensure continued effectiveness of the safety and environmental management system. Further work is needed to improve performance management for Safety and Environmental Protection (S&EP);

   d. accidents, ill-health and incidents are seldom random events. They generally arise from failures of control involving human or technical failure and organisational failings. It is the safety culture within an organisation that determines attitudes and behaviour towards S&EP. The MOD should position itself at the strategic level by deciding what sort of safety culture it wants.

   e. further work is needed to understand the resource implications of S&EP in the context of delivering operational capability.

and agree that this report should form the Board's submission to the Defence Audit Committee (DAC) and, subsequently, to the Defence Management Board;

BACKGROUND

2. The DESB Annual Report provides PUS with formal assurance that the Department is adequately managing its safety and environmental risks; this in turn enables him to sign his Statement of Internal Control. The Report also provides assurance on the extent to which the Department is achieving effective safety and environmental protection and highlights areas of specific concern by identifying common themes and risks. It encompasses contributions from the Chairmen of the seven policy-making Functional Safety Boards (FSBs) and from duty holders responsible for implementing safety management and environmental protection. It provides the basis for a report to the Defence Audit Committee (DAC) and to the DMB.

3. This report covers the 9 months from Apr to Dec 05 to bridge the transition from financial to calendar year reporting, a change required by the Government's 'Faster Closing' programme. However, to allow comparisons with succeeding reports, data in tables and diagrams covers the 2005 calendar year. Reporting is risk-based, aligned with JSP525, and for this year has been improved by reviewing risks in a small working group drawn from across the S&EP community with help from Defence Internal Audit. The small working group also defined the need to collect information on the risk to operational capability of S&EP risks and, where possible, to identify indicative costs. The panel included stakeholder representatives from the Duty Holders (including Trading Funds), Functional Boards, the Services, Scientific Risk and Defence Internal Audit.

Further work based on lessons identified will help to develop better consistency in risk identification, allow us to monitor progress in mitigating extant risks, and streamline the reporting process for the 2006 DESB Report.

AUDIT AND ASSURANCE

4. Three TLB-level audits and one functional audit (Regional Prime Contracting (RPC)) were conducted during the report period. The LAND Command audit was the last one to be conducted on a 'systems' basis, the others were risk-based audits: as agreed by the DESB in Jul 05. Risk-based audit does not produce "scores" that can be averaged for the Department; however, the audit team gives substantial assurance that safety systems are effective, based on the audits so far. The new technique is underpinned by research into the audited organisation and gives a clearer picture of overall risk management, particularly at Board level. Further work is in hand to strike a balance between systems-based, risk-based and functional audits, which are complementary, and to create an indicative 'traffic light' system for performance reporting and key risks. The integration of the 3 types of audit into a single corporate audit strategy will create the means to give comprehensive assurance assessments and resilience to changing audit requirements.

PERFORMANCE

Fatalities

5. Figure 1 below shows data from DASA for on-duty workplace related fatalities on a 3-year average basis, to show trends, for 1995 to 2005 (although verified data for 2005 are not yet available). The results show a disturbing upward trend over the period which implies that underlying systemic weaknesses remain in the way we handle safety. However, the inclusion of non-combat fatalities on deployed operations in the table of injury-related deaths on duty (Fig 1) could mask the success of routine management of safety. Therefore a separate breakdown of numbers of non-combat fatalities on deployed operations (Fig 2), and during routine activities (Fig 3) is also provided. It is axiomatic that non-combat deaths in operational theatres are no more acceptable than other workplace-related fatalities. The data in Fig 2 appear to be entirely in keeping with the pattern of involvement of each Service in major operations during the ten year period. Fig 3 suggests that safety performance other than on deployed operations does appear to be improving.

Figure 1: Number of Injury-related deaths on duty (3 yr moving averages) (excluding suicides)

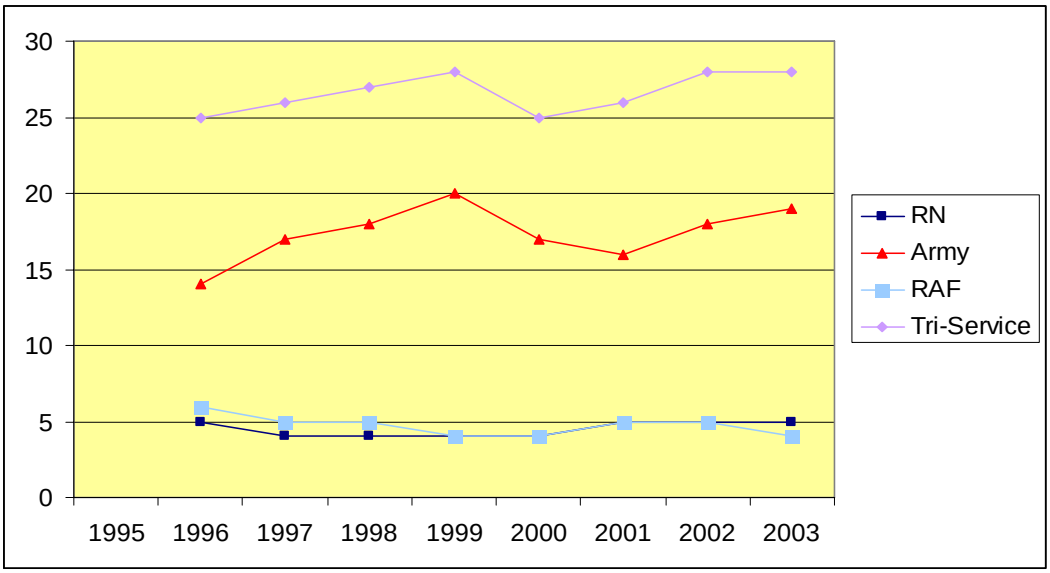


Figure 2: Number of non-combat deaths on duty on deployed operations (3yr moving average)

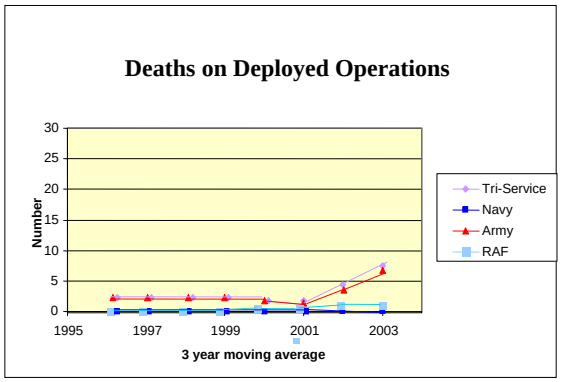
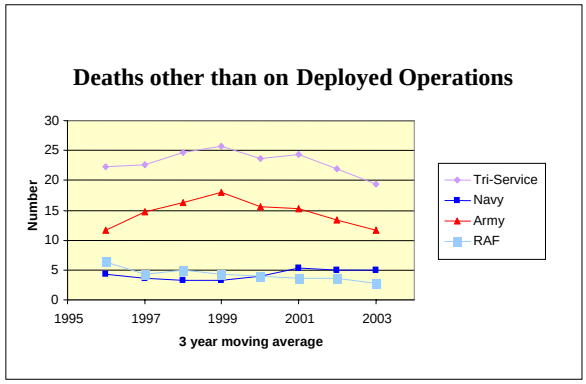


Figure 3: Number of non-combat deaths on duty not on deployed operations (3-yr moving average)

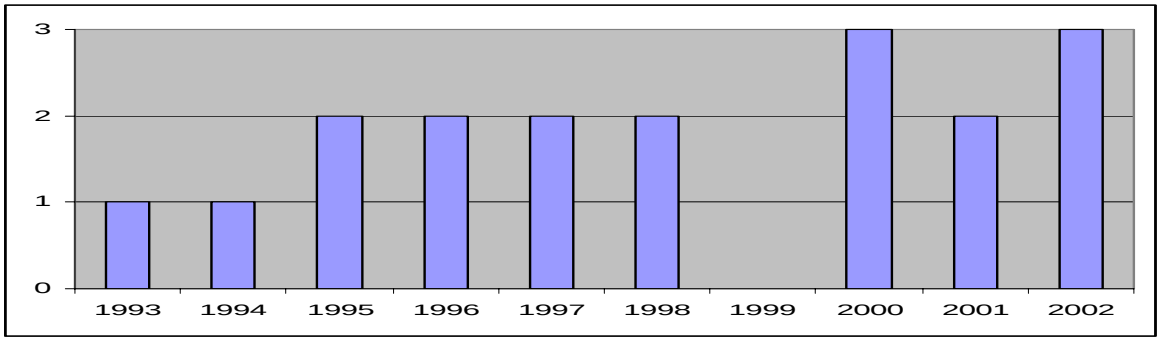


DASA is conducting a more detailed analysis of data to ensure that the Department better understands the context for such fatalities. This will be available shortly. Direct comparisons with other employers are difficult but the Department is improving its ability to benchmark, and learn from the experiences of others. We also need to improve the way we record data – IRIS will help to achieve this on entering service in Mar 07.

Crown Censures

6. Two Crown Censures were served on the Department in 2005 (details are given in Annex A). The number of significant failures in MOD's safety management, as reflected by subsequent Crown Censures, is shown in Figure 2, below. We understand it likely that there will be another Crown Censure, served on the RAF, in 2006 for a fatality that occurred during an adventurous training exercise in 2001 and two more on LAND/DLO in respect of fatalities occurring in 2003 and 2004.

Figure 4: Dates of Incidents that led to Crown Censure.



Pollution

7. There were fewer reported pollution incidents in 2005 than in 2004 and the total escapes for hydrocarbons were down to 15.2K litres in 2005 from 49.9K litres in 2004. However, reporting may not be comprehensive – an issue addressed elsewhere in this Report under Safety Culture and Management Systems. A summary of pollution incidents is at Annex A.

KEY RISKS

8. The risk identification panel confirmed that the majority of the risks reported 9 months ago remain extant; however, it is judged that some safety risks have become more significant and these have therefore been included this time. In the last report, diving risks were identified as a significant cause for concern, underpinned by a fatality just as the report was finalized. The risk

has been downgraded this time after assessing the circumstances of that fatality and the control measures now in place. Key risks are described below under Safety and Environmental sub-headings. An indication of how these risks affect capability, Safety and EP is illustrated diagrammatically at Annex B, together with an indication of the probable trend over the next 12 months.

SAFETY

Safety Culture

9. The Department's Safety and Environmental Management Systems are extensive, risk-based and focused primarily on compliance although they are also driving performance improvement - since autumn 2005, quarterly performance data on fatalities and serious injuries have been reported to the Directorate of Performance and Analysis. Nevertheless, duty holders see areas of weakness arising from 'human factors' rather than system failure, for example: risk identification and management, incident/accident reporting (and learning from this), implementation of Safety Rules and Procedures, safety in operational theatres and also sporadic compliance failures with policies and procedures. The underlying issue appears to be a perception by some that rules and procedures hinder outputs rather than enable them. Consequently, there appears to be a tendency to work around safety management systems rather than within the risk-based framework. For some, the safety system is not seen as a vital part of their own management system. Moreover, advice and guidance is needed on managing safety during organizational change, in line with current practice in nuclear safety.

Management System Weakness.

10. Safety Management Systems consist of key elements: policy, organising, planning, acting, measuring performance, auditing and reviewing performance; this model based on HSE guidance[1] is often abbreviated to 'plan, do, check, review'. In general the first 4 elements are well executed but measuring and then reviewing performance are the key stages that drive continual improvement and these are the least well developed across the Department. Performance reporting to the Centre, a key factor in accountability, only began on a regular basis late in 2005. Safety culture could be improved by strengthening accountability through more effective performance management at corporate level in line with HSE guidance. It is critical that the Department takes a strategic view of the type of safety culture that it wants across Defence if we are to align policy making with operational delivery.

11. Environmental Management System (EMS) implementation is patchy across the Department and we will not meet the formal Framework for Sustainable Development on the Government Estate target which is to have 80% of EMSs in place by 01 April 2006; action is in hand to determine the extent and quality of implementation as it will stand on that date. The Department is also running a pilot for an IT-based EMS that, if successful will give duty holders greater agility in measuring and reporting their environmental performance and thereby increase accountability and also inform policy.

Equipment Safety

12. Equipment safety, both for legacy and new systems, depends on satisfactory acquisition processes and through-life management. Funding should be provided to meet new requirements imposed by changing legislation and regulations. Inadequate in-service feedback of incident data sometimes hinders effective project safety management. The joint DPA/DLO Acquisition Safety and Environmental Support Group (ASESG) was launched in Apr 2005 to provide the systems and expertise to ensure that the MOD's performance requirements for safety and environmental management in Acquisition are met. Environmental and safety scrutiny is being introduced in the project review and assurance process together with a complementary audit regime.

[1] HSE publication HSG 65.

13. Current equipment concerns include the Bowman communications system which was introduced to service with safety limitations that are being managed locally by users. Conventional munitions are more risky than insensitive ones and whilst technology exists to reduce the exposure it is not always resourced and implemented. An Insensitive Munitions (IM) policy is in place requiring all new munitions and all mature munitions at the points of mid-life update, refurbishment or re-provisioning to apply IM technology. The DOSB consider that mitigation is incomplete and will address this at their next Board meeting.

14. Ten MOD aircraft types are not fitted with aerial collision avoidance systems and thus fail to meet civil aviation standards. Installation in Fast Jet aircraft is a high priority but hard to justify for older types close to withdrawal from service and must be balanced against enhancements to operational capability for types that will continue. There have been notable successes: following funding for a fleet-wide fit for the Tucano the modification programme began in Nov 05 and is due to be completed by Nov 07. The fit in the C-130J Hercules has been highly effective. The Tornado GR4 plan envisages an in-service date of 2014 at an overall cost of about £90M and these factors may put the programme at risk. However, with re-profiling of funding, the in-service date can be accelerated to 2010. Ministers wish to be informed if this date is unachievable.

Road Traffic Accidents

15. Road traffic accidents (RTAs) remain a significant cause for concern; in 2005 there were 11 on-duty fatalities as a result of RTAs, 2 fewer than in 2004 (see Table 1). The Army Environment and Safety Board classify off- and on-duty RTAs as the greatest causes of harm to people although the impact on operational capability is assessed as medium. The financial costs of RTAs are high in terms of compensation claims, equipment damage and recruiting/retraining; the Department's most recent Road Safety Report estimated the total financial losses due to RTA in 2004 at almost £136M.

Table 1: fatalities and injuries due to Road Traffic Accidents 2002-2005

Calendar Year	2002	2003	2004	2005[2]
		Fatalities		
On Duty	12	13	13	11
Off Duty	55	45	49	41
Totals	67	58	62	52
		Serious Injuries[3]		
On Duty	67	79	87	Awaiting data
		Slight Injuries		
On Duty	767	714	658	Awaiting data

16. The Army's Driving Standards and Transport Management Committee (DSTMC) in conjunction with the Defence Road Safety Committee are developing a road safety strategy for implementation by the Chain of Command and Arms and Service Directors. Command Master Drivers are leading on further initiatives and education and road safety campaigns aim to raise awareness of the risks, improve driving standards and the supervision of drivers.

Roles and Responsibilities on Multi-Occupier Sites.

17. The introduction of new contracting arrangements including Regional Prime Contracting and Project Aquatrine has demonstrated the need for greater clarity over roles and responsibilities for delivering safety and environmental management. This is particularly relevant to multi-occupancy sites, where Commanding Officers and Heads of Establishment remain unclear about their responsibilities. A detailed *Control of Contractors Action Plan* is in place to implement recommendations from a recent audit. However, there remain weaknesses in the way contracts are worded and implemented and in the level of understanding of roles and responsibilities. DE are developing advice and guidance on these in conjunction with Directorate of Safety and Claims. It

[2] Provisional figures – subject to change.
[3] Data not available for off-duty injuries

remains the case that Heads of Establishment and Commanding Officers must comply with the mandatory requirements and guidance provided in JSP375 Vol 2 Leaflet 34, including the appointment of a 4Cs co-ordinator.

Infrastructure

18. The Regional Prime Contracting initiative has and will continue to improve the condition of the built estate over time and thus reduce the risk of injury and claims. However, there are concerns that Integrated Estate Management Plans should include environmental risk assessments in order to set priorities correctly if operational capability is to be maintained: S&EP staff will need to actively engage in the processes. The Army ranges at Lydd, Hythe and Fingringhoe are constantly in danger of being lost to coastal erosion. The £600K annual cost of maintaining their sea walls has been borne by the Army but DEFRA and the EA, who hold responsibility for flood protection, have accepted that the ranges are essential and have agreed to share responsibility for flood defences. This should significantly reduce the costs to the Army for whom replacement ranges would have cost £180M. Similar issues may arise again if climate change threatens infrastructure elsewhere.

19. DLO have highlighted serious shortcomings in the condition of the ordnance, munitions and explosives storage infrastructure at three sites where safety and regulatory requirements increase the priority for maintenance and upgrades in order to maintain operational capability. DLO and DE are jointly addressing the condition of the OME estate with a series of reports to the Defence Ordnance Safety Board (DOSB).

Suitably Qualified and Experienced Personnel

20. The Royal Navy reports a shortage of suitably safety-qualified and experienced reactor plant watchkeepers and medical assistants without whom submarines may not sail. In the short term, the manning, training and retention issues are being addressed. The DOSB reports that engineers' and scientists' competences for safety critical technologies are causing concern but that management strategies are being developed to address the shortfalls.

Non-Compliance with Specific Legislation and Regulations

21. The MOD does not comply with government policy on nuclear decommissioning in that there is no detailed, overarching decommissioning and disposal strategy for nuclear submarines. This is a significant reputational concern even though there is a negligible likelihood that the laid-up submarines (both those already de-fuelled and those awaiting de-fuelling) will cause harm, in the Defence Nuclear Safety Board's view. The subject has a high public profile and the Department does not compare favourably with the civilian sector's progress in this area.

22. There is a low probability that MOD may not be able to comply with the NATO Single Fuel Policy on operations using commercially available engines; however, the impact on capability would be potentially high. This is a well-known risk common to the NATO countries and a technological solution is being sought by the Defence Fuels Group that may require resources.

ENVIRONMENT

Environmental Noise

23. Concern about environmental noise, mainly from military flying but also close to tank and artillery ranges, is a consideration that must be balanced against operational capability. The Aircraft Environmental Noise Report (Jan 04) made a number of recommendations to improve the management of environmental noise and, as appropriate, these are being taken forward and monitored through an *Environmental Noise Action Plan* monitored by the DESB PMC. The RAF basing study on Nimrod MRA4 and JCA, announced in Nov 05, will take noise into account during its consideration of the various options. In 2007, RAF St Mawgan will close and the exercises

conducted there will transfer to RAF Fairford which will see noise levels sharply increase: the policy on the Noise Insulation Grant Scheme suspension needs to be reviewed as a consequence.

24. In response to the Coroner's recommendations following the Heather Bell inquest, MOD conducted a comprehensive review of helicopter low flying that, amongst other outcomes, has resulted in the routine helicopter low flying height being raised from 50 to 100ft above ground level, whilst retaining the ability to train at lower levels for specific activities. DAS continues to work with the British Horse Society and other organisations to enhance the safety of horse riders.

Land Contamination

25. Land contamination as a result of current and past defence activities remains a serious reputational and financial risk. Storage and transport of military hydrocarbon fuels represents a particular risk to human health and the ecology: soil and groundwater pollution is common within and around fuel storage areas. Where these areas are close to sensitive receptors such as residential housing or designated areas of conservation, the risk is particularly high and requires careful management by characterising the extent of contamination and mitigating its consequences. In general, new spills are less problematic than legacy ones, for which we often lack comprehensive information on the nature and extent of contamination. Land Quality Assessments (LQAs) are underway but, in many cases, the cost of remediation would be high. A recent review of legacy CW contamination has identified a number of sites potentially contaminated with CW agents or their breakdown products. Ministers have accepted a prioritised list of 11 of these sites at which physical investigations will be used to work-up a methodology for dealing with the issues; DE have been asked to lead. Despite this legacy issue, the Department can claim credit for many examples of good environmental management of the Defence estate including public access, biodiversity and landscape preservation.

SCIENTIFIC RISK

26. The DESB is aware of emerging scientific risk identified in the SIT area. There is a close working relationship between DS&C and SIT and the following are being monitored mutually:

a. Nanotechnology. The risks from nanotechnology are as yet unknown but there is potential for health, safety and environmental effects.

b. RF Risks to People. The SIT Risk team is monitoring any emerging studies that may suggest the existing RF radiation risk mitigations are inappropriate; the outcome may affect operational use of all radios – notably the Bowman system.

c. Perchlorates. An oxidiser in rocket fuels and pyrotechnics, perchlorates have been shown to bioaccumulate although as yet UK has no known problem. Dstl have an accredited analysis technique should there be a need to test samples.

d. Tungsten and its Alloys. Used in some munitions, tungsten alloys are an alternative to depleted uranium. Tungsten alloy fragments have caused aggressive tumours in laboratory rats but UK uses a different alloy to that tested and other species have not been tested. The dramatic result may not be relevant but is in the public domain. DASA are looking at historical data and Dstl are carrying out research.

e. Cetaceans and Sonar. The media do not shrink from suggesting that military sonar is harmful to cetaceans and regularly results in beachings (and even the Bottle-nosed Whale excursion into the Thames in Jan 06). Much work has been done to manage the risk from military sonar by understanding migration patterns (and planning exercises to avoid them), initiating bridge watches and understanding sonar footprints. The Royal Navy engages with environmental groups on this subject. Currently only 14 frigates have active sonar.

Annexes:

A. Crown Censures, Improvement Notices and Pollution Incidents – 2005.
B. Risk Assessment and Trend Diagrams.

ANNEX A TO
DESB P(06)1

CROWN CENSURES, IMPROVEMENT NOTICES AND POLLUTION INCIDENTS – 2005

Crown Censures

- Commando Training. On the 19 Jan 2005 a Crown Censure was served on MOD for failing to take reasonable steps to ensure the health and safety of employees following the accidental, fatal shooting of a RM Recruit during a training exercise at the Commando Training Centre (CTC) Lympstone in Mar 2000. Royal Navy Armed Sentry Procedure was changed following this incident and training and guarding roles separated. Safety critical procedures were included in CTC staff training and risk assessments are now conducted for all aspects of training at CTC.

- RM Poole. On the 24 Jun 2005 a Crown Censure was served on MOD (RM) as a result of an incident which occurred on the 11 Sep 2002 at RM Poole in which severe injuries were caused by a malfunctioning Safety Air Line Gun. Key to the HSE's decision to Censure was the lack of a risk assessment for the activity, and lack of communication between project staff at Poole and local health and safety staff. As a result, the DPA and DLO have issued joint instructions to IPTs on safety management during tests and trials.

The Following May Result in Crown Censure During 2006:

- RAF. The RAF is in the process of receiving a Crown Censure by the HSE, following a climbing accident that resulted in the death of a Flight Lieutenant in 2001.

Crown Improvement Notices

- Army. The Army was served with one Notice for failing to put adequate controls in place for risks whilst working with chemicals: in particular, Cleenol Screen Wash. The Notice was served on the Commandant Headquarters Army Training Estate East. Remedial action is still taking place.

- RAF. The RAF has been issued with two Notices by the HSE. The first was issued following an incident during routine maintenance work on a running Tornado Auxiliary Power Unit. Improvements have been made to the operational procedures and instructions as detailed in the Tornado Aircraft Air Publication to prevent any future recurrence. The second notice, issued as part of the original incident investigation, was for inadequate Control of Substances Hazardous to Health (COSHH) assessment. The control has been resolved for the substances involved and the Directorate of Safety and Claims (DS&C) is in the process of reviewing and rewriting the policy and guidance on COSHH assessments to reflect the findings.

- Dstl. Dstl received Notice from the Environment Agency as a consequence of not maintaining adequate records of emissions measurement. Management remedied the error immediately.

- DLO. A Notice was served on the DSDC Ashchurch site for failure to conduct a suitable and sufficient assessment of risks arising from vehicle movements on the site. The site is conducting a survey of vehicle and pedestrian movements. The recommendations from the survey report and resulting action plan should serve to lift the Notice, and will be in place by 31 March 2006.

Crown Prohibitions

Nil

Pollution

- Army: On 2 Nov 05 an accident on Salisbury Plain Training Area (SPTA) resulted in the spillage of 1800 litres of diesel into a large puddle. The MoD environmental contractors (Briggs) were quickly tasked to clear the spill, take soil samples and provide advice on any further remedial action required. A team leader from the Environment Agency (EA) and a CESO(A) representative attended the incident and a unit report and advice from Briggs is awaited.

- Army: There have been two reported incidents involving the accidental disposal of ammunition when it was mixed with declared non-hazardous waste: 276 rounds of belted live Minimi light machine gun ammunition and spent smoke grenades at Otterburn and spent and unspent explosives and some hazardous waste at Westdown Camp.

- RAF. The RAF's pollution incidents recorded for the period of the report are summarised below:

  Tier 1 – There were 56 minor spills categorised as Tier 1 spills of Avtur, hydraulic oil, diesel and furnace fuel oil.

  Tier 2 - There were three reported pollution incidents categorised as tier 2, Two spills (fire fighting foam and Avtur) caused pollution of interceptors. The other spill was caused by a waste contractor whilst removing waste oils; this was contained and cleaned up at no cost to the RAF.

  Tier 3 - There were two incidents that were categorised as Tier 3 that required the attendance of an outside contractor and the involvement of the EA and SEPA. The first incident involved a leak of between 2000 and 5000 litres of diesel oil from a broken underground pipeline. The second was a sewage leak from underground pipe work that polluted a School Playing Field; the quantity leaked was not identified.

  All recorded incidents were cleaned up satisfactorily using local spill plan procedures and outside specialist contractors to the satisfaction of the Environment Agency or Scottish Environment Protection Agency.

- CJO. There were minor spillages at Ascension Island: 2 spillages of Avtur totalling 7400 Litres and 1 spillage of 4.5 Tonnes of sullage. In all instances spill Plans were activated and post incident investigations conducted.

- CTLB. DISC, Chicksands, reported a spillage while refuelling an underground fuel installation. As a result of equipment/infrastructure failure, fuel leaked into a local watercourse. Remedial action has been taken. PPPA, Cheadle Hulme, reported a fuel oil leak that resulted in less than 1000 litres overflowing to ground when a solenoid valve failed to close. Fuel did not enter the local water course, foul or surface drainage and was contained on site. Both incidents were of a relatively minor nature with no formal regulatory action being taken. The lessons learned from both incidents are being shared with the wider CTLB community.

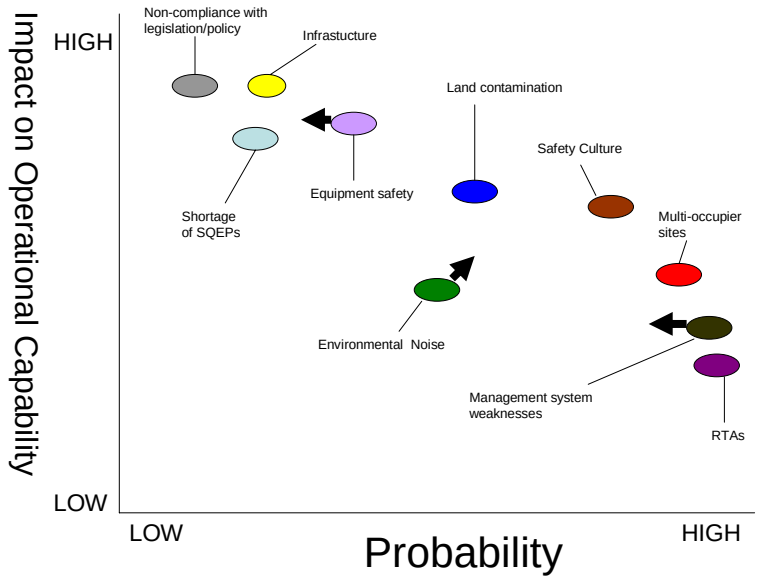
- DMETA. There was a breach in the waste regulations at Haslar/Fort Blockhouse whereby low value radioactive waste was disposed of incorrectly. This was due in part to the fact that the contract for the disposal of clinical waste did not include provision for the disposal of low value radioactive waste. The Environment Agency visited the site and issued a warning. A contract has now been placed with Biffa for the disposal of specialist waste.

- Dstl. A quantity of contaminated water was spilt to ground whilst being transferred to the on site incinerator quench tank. The Environment Agency was informed. The spillage was significant

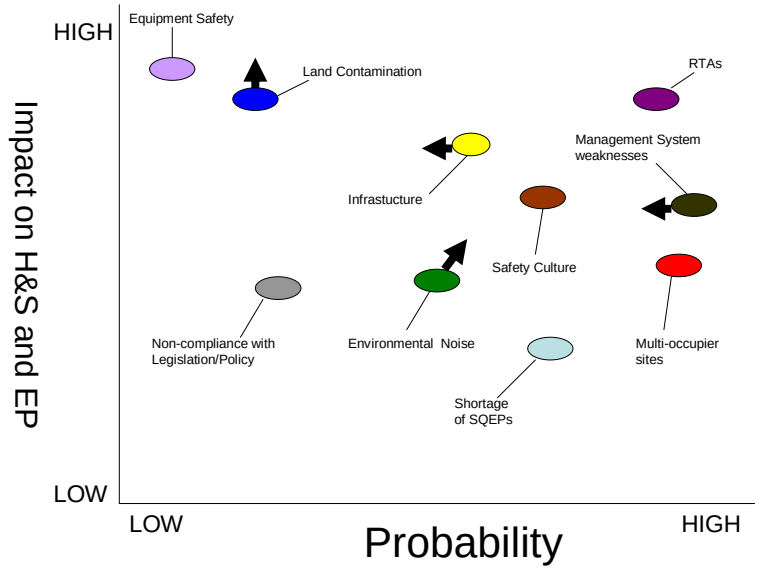
as it was in relatively close proximity to a water abstraction borehole (400 metres down gradient). Remedial action was taken to mitigate the likelihood of the contaminated water reaching groundwater. Contaminated soils were excavated and incinerated. Dstl carried out an investigation which was reported to the Environment agency. The EA carried out an on site inspection following receipt of the report and at its conclusion stated they were content with the actions taken to address the causes of the incident.

RISK ASSESSMENT AND TREND DIAGRAMS

Top Risks to Capability – 05(2) DESB Inputs



Top Risks to Safety and EP – 05(2) DESB Inputs



Arrows indicate predicted trend over next 12 months