



**Institute for Environment
and Health**

An objective assessment of systems
for the collection and analysis
of exposure data in the
United Kingdom Armed Services

Volume II: Reports of visits to Service Units and organisations

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The views expressed here do not necessarily represent those of any Government Department or Agency

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Volume II of two volumes.

Volume I is: *Main Report*

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1 Introduction

The ability to assess the exposure of individuals or groups is a crucial element in any effective health surveillance system. It allows identification of the causes of ill-health and implementation of measures to protect the health of personnel. As part of a wider programme to enhance the health surveillance capabilities of the Defence Medical Services, the MRC Institute for Environment and Health (IEH) was contracted by the Defence Evaluation and Research Agency (DERA)* to assess the collection and retention of data for exposure assessment in the United Kingdom Armed Services.

IEH Web Report W9, *An Objective Assessment of Systems for the Collection and Analysis of Exposure Data in the United Kingdom Armed Services, Volume I: Main Report*, evaluates the systems that were investigated for exposure assessment and makes recommendations for enhancing their usefulness for this purpose. This report, *An Objective Assessment of Systems for the Collection and Analysis of Exposure Data in the United Kingdom Armed Services, Volume II: Reports of Visits to Service Units and Organisations*, is a compendium of all the reports of visits made by IEH staff to various Units and organisations within the Services and selected relevant civilian organisations. All the reports were sent to the Unit or organisation visited for comment and, where necessary, correction. Comments received have been taken fully into account. During most visits IEH staff were provided with examples of forms used and other documentation. Names of individual contacts have been removed from the reports.

Section 2 of this volume comprises the reports of the site visits categorised as follows: 2.1, health, safety and environment policy; 2.2, personnel and pay administration systems; 2.3, medical records; 2.4, occupational exposure and environmental monitoring data; 2.5, historical records; 2.6, users of Armed Services information systems; 2.7, examples of data systems in civilian industry. Abbreviations and acronyms used are defined in the Annex.

* Now the Defence, Science and Technology Laboratory

2 Visit Reports

2.1 Health, safety and environment policy

2.1.1 Directorate of Safety, Environment and Fire Policy

Date of Visit: 4 May 2000

The Directorate of Safety, Environment and Fire Policy (D SEF Pol) is headed by the Ministry of Defence (MOD) Chief Environment and Safety Officer (CESO) and includes divisions covering:

- Explosives and its Transportation
- Fire
- Environmental Policy
- Radiation Policy
- Occupational Health and Safety
- Audit

The department is responsible for tri-Service and civilian health and safety policy in the United Kingdom (UK) and abroad. In general, all UK health and safety legislation is applicable, although in exceptional circumstances the Secretary for State can grant an exemption. An example of this is the recent ban on asbestos, which is still required for some UK nuclear weapons. The general MOD Health and Safety handbook on legislation is Joint Service Publication (JSP) 375. At present it focuses on what the legislation covers, rather than on how to carry out the policies. It is left to the local organisations to implement and this may vary considerably. The line managers within each Service organisation have to indicate what arrangements and procedures have been put in place for implementation. The qualifications and skills of the line managers will also vary, although there is quite a lot of health and safety training available, some of which is specialised, for example noise assessment, first aid.

The Directorate of Safety, Environment and Fire Policy (D SEF Pol) produces a general risk assessment procedure manual and also a Control of Substances Hazardous to Health (COSHH) Assessment Manual (JSP 424), and standard forms on which to record various surveys, such as:

- MOD Form 911 *COSHH Assessment*
- MOD Form 933A *COSHH (LEV Plant) Maintenance Examination and Test Record*
- MOD Form 933B *COSHH Respiratory Protective Equipment (RPE) Issues from a Central Point*
- MOD Form 933E *COSHH — Routine Exposure Monitoring*
- MOD Form 933F *Control of Substances Hazardous to Health (COSHH) Regulations — Personal Exposure and Health Surveillance Record*
- MOD Form 936 *Laboratory Assessment*

There are also forms for noise, display screen equipment (DSE) and manual handling. (NB All the risk assessments are kept on paper, there are no computer systems.)

At present there is no MOD policy on retention of risk assessments and probably most old COSHH forms are discarded, unless there has been an incident and they have been kept as part of the incident report.

A catalogue of personal protective equipment (PPE) exists, JSP 427, which includes information on effectiveness. A risk assessment should identify the need for PPE and then the appropriate equipment can be selected using JSP 427. It should be noted that civilians are not legally allowed to use PPE developed solely for the military even if this would be the best, unless it is CE marked.

There is a Health and Safety Executive (HSE) Crown Fire and Police National Interest Group (NIG), which meets with the MOD. The Crown NIG monitors application of the Health and Safety legislation through its inspectors. For a standard MOD establishment in the UK an HSE inspector could just turn up, although this is not generally done.

Documents provided

- MOD Form 911 *COSHH Assessment* (1989* and 1993 versions)
- MOD Form 911A *COSHH Assessment — Hazard(s)**
- MOD Form 911B *COSHH Assessment — Risk**
- MOD Form 911C *COSHH Assessment — Certification & Reviews**
- MOD Form 911D *COSHH Assessment — Outstanding Actions**
- MOD Form 911E *COSHH Assessment — Specialist Advice**
- MOD Form 911F *COSHH Assessment — Master Register**
- MOD Form 936 *COSHH Laboratory Assessment*
- MOD Form 933A *COSHH (LEV Plant) Maintenance Examination and Test Record*
- MOD Form 933B *COSHH Respiratory Protective Equipment (RPE) Issues from a Central Point*
- MOD Form 933C *COSHH Respiratory Protective Equipment (RPE) Maintained by Users*
- MOD Form 933D *COSHH Respiratory Protective Equipment (RPE) Small Stockholders*
- MOD Form 933E *COSHH — Routine Exposure Monitoring*
- MOD Form 933F *Control of Substances Hazardous to Health (COSHH) Regulations — Personal Exposure and Health Surveillance Record*
- MOD Form 945 *Noise Assessment Record*
- Chapter 8, Risk Management, from *MOD Health and Safety Handbook* (JSP 375)

*Note that as from 18 May 1999 these forms have been withdrawn from use

Potential sources of further information

- CESOs: Royal Navy (RN)
Army (Netheravon)
Royal Air Force (RAF), RAF Innsworth

It was suggested that IEH staff spend a day with a Unit to shadow a Safety Officer.

Further information available from: Deputy Chief Environment and Safety Officer
Occupational Health and Safety (DCESO/OH&S)
St Christopher House
Room 5/118
90–114 Southwark St
London
SE1 0TD

2.1.2 Chief Environment and Safety Officer (Army)

Date of Visit: 22 August 2000

Introduction

The purpose of the visit was to gather information on the application of health and safety policy in the Army. The Chief Environment and Safety Officer (Army) (CESO(A)) is responsible for interpreting and implementing policy directives set out by D SEF Pol (see also visit to D SEF Pol, Section 2.1.1). A draft of this visit report was forwarded to the CESO(A) and this version incorporates the comments and answers to queries received.

Structure

During the All Encompassing Safety Organisation Post Strategic Defence Review (a major study sponsored by D SEF Pol), it was proposed to establish the Defence Environment and Safety Board (DESB), chaired by the Under Secretary of State for Defence. The DESB comprises the Commanders-in-Chief Land, Strike and Fleet, and heads of all agencies; essentially this represents all Top Level Budget (TLB) holders and agencies. The DESB will meet for the first time in November 2000.

Under the DESB are functional boards chaired at the two star level: the Defence Environment Safety Committee (DESC; this is the MOD Safety, Health, Environment and Fire (SHEF) committee, chaired by the Director General Safety and Security; representatives from all MOD departments attend); the Defence Ordnance Safety Board (a new board); the Land Systems Safety Board (LSSB); the Army Environment and Safety Board (AESB; this board met for the first time in June 2000 and is chaired by the Deputy Chief of Staff Land).

Land Systems Safety Board

The LSSB sits within the Defence Procurement Agency and sets out the safety case for new equipment. This is developed by the Integrated Project Team (IPT) and looks primarily at a system's effectiveness, but must include considerations of ergonomics (effects on the individual; human factors), health and safety and the environment (e.g. vehicle exhaust emissions). For example effects on the crew resulting from excessive noise should be engineered out of the system; PPE is a last 'line of defence'. The aim is to deliver a safe system to the Army.

Once a piece of equipment/system is in place and in service, the safety case is handed to the IPT at the Defence Logistics Organisation (DLO). The DLO manages equipment in service, which includes a health and safety remit. For instance, if issues arise during service, it is the role of DLO formally to instigate changes/alterations to ensure safe working practice. In procurement and service, Arms and Service Directors (experienced engineers, artillery officers, etc.) develop and produce operating manuals for the use of equipment in service. At present the CESO(A) is teasing out how it might be possible to establish an audit trail from the procurement of equipment through to its disposal. The aim is to define individual responsibilities throughout the process.

Army Environment and Safety Board

The AESB is chaired by the Defence Chief of Staff (Land) and has the CESO(A) as a technical advisor. The main activity of AESB is to reduce injury/accident in the Army (force protection) and covers training, in-barracks, transport and radiological protection. The Army has a legal, moral and financial responsibility to ensure its personnel are protected (as far is practicable within operational constraints) from injuries and accidents. Present figures show the Army loses approximately 200 soldiers per year through fatalities or discharge due to injuries and accidents (while on duty). They now have a target to reduce this figure by 10% by 2002.

Exposure to noise

A particular hazard highlighted by the CESO(A) was noise. D SEF Pol has performed an audit on noise issues and CESO(A) took the lead on assessing musicians. For those at high risk of exposure to noise (e.g. musicians and range officers), their medical checks include an annual audiometry test. Others assessed as being at lower risk get a biennial test. Individual medical information is, understandably, confidential. The CESO(A) mentioned a Defence Evaluation and Research Agency (DERA) project assessing the exposure to noise in the band room at Basingbourne. As well as measuring exposure, the project is also addressing the issue of seating, room dimensions, instrument positions (both indoors and on parade) and mitigation measures such as periodically moving musicians around to alter their exposures. Such recommended mitigation measures may incur costs, which individual Units may have to absorb.

Training

Training hazards are another major concern from a health and safety viewpoint. Within JSP 375 (which is now being rewritten) there is a section on training risk assessments and a number of generic risk assessments have been produced as individual pamphlets. The aim is to introduce into the overall 'culture' the concept of 'as low as reasonably practicable'. The Training Accident Investigation Team investigates all training accidents and operates with complete autonomy. There is a follow-up of accident reports after one year to see whether recommendations from the original investigation have been acted upon. Under the control of the Chief of Staff (Land), the Standing Committee on Training Safety (Army) answers to the Defence Land Ranges Safety Committee.

Accidents — reporting and notification

Any and all accidents or activities that result in a casualty are recorded through the NOTICAS (notification of casualties) procedures. There is also a weekly report on the numbers and circumstances of deceased personnel; the statistics include road traffic accidents and suicides off duty; all others relate to activities on duty.

The Central Health and Safety Project (CHASP) is a computer-based system for data gathering and reporting purposes that is run for D SEF Pol. There are currently some problems with CHASP in terms of access (not everyone has access) and how it is being implemented. For instance, while the RAF reports everything through CHASP, the Army only includes accidents where more than an hour off duty results. CHASP II aims to reduce/eliminate any such problems. Furthermore, the Army aspires to a process similar to that of the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR). At the moment there is no incident (i.e. near misses) reporting process which if instigated could help to prevent accidents actually occurring. At present there are 24 ways in which accidents may be reported in the Army (for instance, accidents with explosives are not reported in the same way as transport-related accidents). Although there is no way completely to standardise accident reporting across the breadth of Army-based activities, the CESO(A) hopes to be able to standardise the way in which accidents are notified. This aspiration involves establishing a dedicated focal point with a single telephone number that then redirects incident and accident reports to the appropriate department/agency. This would include a logging process for the report and any recommendations or assistance given by the focal point. There would also be an electronic database and auditable trail by which to follow-up reports and actions.

CHASP may link with FMT3, the traffic accident reporting form. Based on these forms it is hoped that trends in accidents and their causes (e.g. fatigue, training-related, driver's age) can be identified.

Other issues

JSP 375 should be the 'bible' for all health and safety issues in the Army (and the other services). However, the Army still produces Land Standing Orders for specific activities.

JSP 445 addresses environmental protection issues. An Environmental Management System (ISO 14001) is being introduced.

There is an aspiration to establish an authority to audit the SHEF performance at divisional Headquarters (HQ) and samples of Units every three years. There is currently a contracting process going on that will seek outside companies to provide an advisory and auditing function across regions. The plan is to combine SHEF audits and military fighting power assessments (while co-ordinating with Specialist Staff Inspections (SSIs) performed by local Environmental Health Teams (EHTs) and minimise any disturbance to the Unit/HQ). The contractor will also be asked to provide a helpline, the experience of which will in turn feed into the establishment of a central accident/incident notification system. There will also be a data recording facility as part of this contract. The contractor's project manager will ideally be located within HQ Land.

The Commander-in-Chief (Land) has control of 75% of the Army staff; Land Command provides almost 100% of the fighting capacity of the British Army. There are five requirements to achieving and maintaining this capability: training, equipping (readying for deployment), sustaining men, sustaining equipment, providing the infrastructure in the UK to be able to achieve this.

Once an operational need is identified, the Government tasks Permanent Joint Headquarters (PJHQ) to send the required forces. PJHQ in turn goes to HQ Land for the staff and equipment. The Commander-in-Chief (Land) retains full command of this staff and equipment, but 'operational command' falls to PJHQ.

Further information available from:

Chief Environmental Safety Officer (Army)
Headquarters Land Command
Building 2B, Airfield Camp
Netheravon
Salisbury, Wiltshire
SP4 9SF

2.1.3 Army Medical Directorate

Date of Visit: 19 May 2000

Introduction

This was the second visit made by IEH to the Army Medical Directorate (AMD; see also visit of 24 June 1999, Section 3.3.2). A draft of this note was forwarded to the team leader and comments and further information received are included here.

The Health Safety and Environment structure for the Army is evolving. High-level tri-Service policy is dealt with by the D SEF Pol. In the Army, responsibility lies with the CESO(A). Health and safety focal points are established at District and Divisional HQ, and Units are required to have a Unit Safety Advisor (USA).

There are various training topics open to individuals in the Army and guidance is given to Unit Commanders on which training their troops should receive during the year. These requirements are set out in Individual Training Directives (previously Army Training Directives). Topics include first aid, health and safety awareness and fitness training and testing.

Medical Intelligence Assessments

The team leader outlined the work the Unit does in providing information to Units deploying to specific locations. Every month the Medical Intelligence Cell (MIC) is given a briefing on potential deployments, each with a varying degree of likelihood (from low to imminent). This briefing provides a monthly work schedule so that MIC is not surprised by an unexpected information request. A faster response is needed for Special Forces deployments. The Medical Intelligence Assessments (MIAs) can apply to any size of Unit from reconnaissance parties to large-scale deployments as seen recently in Sierra Leone (as an example of a standard MIA, an unclassified copy of the assessment for the Sierra Leone deployment was provided to IEH). For individual travellers, a commercial package called Traveller is used which provides information on, for example malaria chemoprophylaxis regimes and other necessary vaccinations for the destination.

The MIA, which is advisory rather than prescriptive and may be classified for security reasons, goes to planners and feeds into their directives as a medical annex. Its aim is to provide information on environmental conditions, diseases and vectors which may be present in the country under review, together with an overview of its current medical capability, in order to facilitate management of manpower wastage due to disease and non-battle injury (DNBI). The document provides the following information:

- a description of the country: topography, climate, population, and living and sanitary conditions;
- a profile of diseases of operational importance, divided into: respiratory diseases, gastrointestinal illness, vector borne diseases and other diseases;
- a profile of environmental risks of operational importance, divided into: general environmental health risk assessment, water supply (sources and treatment/distribution), pollution, and hazardous animals (snakes, scorpions, spiders, centipedes etc.);
- a medical situation assessment, including: medical provision, public health, medical material, provision of emergency medical services, and medical facilities; and
- conclusions and recommendations addressing such issues as the responsibility for medical service provision, water, power and fuel supplies, health threats, the adequacy of local facilities (both military and civilian).

In the Sierra Leone example provided by MIA, the main body of information was supplemented by information on medical facilities in the capital city. The example also included medical threat management recommendations (with information for all three services):

- pre-deployment measures — employment standards (the fitness of the troops deployed), dental fitness, immunisation, anti-malaria precautions, blood grouping, first aid/health training, Unit hygiene trained personnel;
- measures during deployment — water, food, disease vector avoidance, sanitation and refuse disposal, arthropod and rodent control, prevention of heat illness;
- post-deployment measures; and
- conclusions.

Forces protection in joint operations (Joint Doctrine Pamphlet 1/99)

The AMD provided a copy of the above document, which sets out to codify the principle that losses from DNBI should be minimised. Such pamphlets are the driver behind a great deal of other work and are applied on a Service-by-Service basis.

Land Command Management — A Commander's Guide to Health and Safety and Environmental (Health, Safety and Environment) Risk Management (Edition 1, December 1998)

The AMD provided a copy of this document, produced by G4 Operations and Plans, HQ Land Command. This document provides guidance for commanders and aims to provide them with the knowledge and confidence to manage risks while at the same time protecting their personnel and the environment. The central tenet is that of 'Force Protection' — safe working practices and a safe environment are key to maintaining fighting power. The document includes:

- the fundamentals;
- risk management;
- health, safety and environment on operations;
- health, safety and environment during training; and
- health, safety and environment in barracks.

Each Unit must have a USA to assist commanders in the execution of their responsibilities for health, safety and environment issues. This requirement forms part of an overall requirement within Units.

Examples of Environmental Monitoring Team involvement

The AMD provided two examples of incidents to which the Environmental Monitoring Team (EMT) input was sought. Both examples illustrate that measuring pollutants is often seen (by local service personnel) as an essential first step, but that in fact decisions and actions can be taken without such information. Indeed, the measuring of pollutants can even be a stumbling block delaying decisions until more information is gathered.

The first example involved a garrison in Brunei during a period of smog resulting from forest fires in South East Asia. Air quality concerns were uppermost in the inhabitants' minds and it was felt that 'something should be done'. A request was made for EMT to 'measure the health effects of the smog'. Although it was unlikely that any measurements of pollutants would actually aid a decision, any activity was seen as good activity (despite it essentially stalling the decision process). It was also

possible to obtain local information from other sources (a nearby Shell refinery and the Brunei Government). However, a monitoring team was sent nonetheless and simple recommendations were developed (e.g. wear masks if it is smoky, close windows, consider repatriation of non-service personnel if the situation worsens).

The second example involved a local HQ established in Banja Luka close to a burning municipal waste tip. It was assumed that it would be necessary to measure the pollutants and compare these measurements with standards (though it was not clear which standards to compare against). Without monitoring, there were basically four decision options:

- move the tip;
- extinguish the fire and manage the tip;
- move the HQ; or
- do nothing.

The monitoring information did not help in choosing one of these options but succeeded in delaying the decision.

The strategy employed involved health surveillance, environmental monitoring and follow-up action. The AMD was able to use epidemiological methods to assess health outcomes at Banja Luka compared with another base (Sipivo) but found no great difference in symptoms. By looking at each deployment a pattern emerged of excess sickness reported soon after arrival, which, over time, decreased (a similar pattern is seen in other 'chronic' operations; in 'acute' operations, sickness is less reported due to lack of time and the team ethic). It is thought this is due to individuals expecting to suffer ill effects through hearsay and the desire to get information onto their medical records in case of future ill health problems.

Environmental monitoring showed no significant levels of asbestos, volatile organic compounds, dioxins, pathogens or respirable particulates. Again, simple recommendations were established such as limiting exercise when the smoke was at its worst, closing windows and turning off intake fans.

Army Project 3

A team member presented information on digitisation efforts currently being established to track troops on operation. The aim of Army Project 3 (AP3; now being piloted as Project Ryan in Bosnia and due to go live in September 2000) is to improve operational capability, starting at the UK base. [It is understood from previous discussions with the Armed Forces Personnel Administration Agency (AFPAA) Worthy Down that the system centres around a process of swiping individual soldiers/officers into and out of theatre at a series of defined entry points using smart card technology.] AP3 will affect force preparation, deployment, sustainment, operations and recovery. There are many systems and programs in use in the Army, the aim of AP3 being to bring them together. It will be necessary for the new systems to link to older 'legacy' systems such as the unit computing (UNICOM) system. These systems rely on electronic communication and are therefore subject to electronic countermeasures.

AP3 will involve tracking troops and casualties, planning support force generations and skill sets etc., reporting and recording information and personnel administration (e.g. NOTICAS, notification of casualties). In peacetime (in barracks), AP3 is not used as it is an operational, deployable system. Although it is hoped the swiping in and out of *all* personnel will be achieved, there is likely to still be some fuzziness (in theatre, data gathering for AP3 may not be a priority during war fighting). Standard reports will be produced, including a daily return to PJHQ. AP3 will capture data from AFPAA Worthy Down and record entry and exit from operational theatres. It will be possible to interrogate the information by time and location, force element, place of origin, skills and qualifications. From a

medical viewpoint, the commander of a force needs to be able to access information on his ability to achieve a goal — this could involve dental, medical and vaccination information.

Communicable diseases

Any occurrence of a communicable (infectious) disease is notified to the appropriate reporting authority using the F Med 85 form (copy given to IEH). The list of diseases included is not the same as the normal UK list. A copy of the form is placed on the medical file and notification must be by the fastest means possible. The AMD collates information and looks at it geographically to detect clusters and over time to see trends. A summary is sent to the Surgeon General (SG). In the event of an outbreak in the UK, the local environmental health (Army) personnel liaise with the civilian groups. More widespread outbreaks (e.g. across two or more health authorities) will be handled by AMD. Notification of communicable diseases is greatly encouraged, but it is likely that the reporting is only the tip of the iceberg. A copy of the SG's policy letter 4/97 *Communicable Disease Control in the Armed Forces* was given to IEH.

During operations, the notification is by signal, not paper based. Also, considering the stresses of operations (also see information above on Banja Luka re sickness reporting), it is likely that reporting of disease is incomplete. There is a cross collation with other services on a monthly basis and an annual report providing a narrative on reducing morbidity aimed at management and giving simple statistics on the repercussions of communicable diseases (e.g. work days lost).

Environmental Monitoring Team

The EMT answers queries from Units/local health teams (UK or deployed) in an almost entirely reactive way. The first port of call at the Unit level is the local health team (which includes environmental technicians) who will perform monitoring and sampling tasks locally; if the problem falls outside their expertise, they can call on the EMT for advice and input. The local health teams send samples to EMT for analysis and reports are then produced locally. The EMT develops a data collection strategy and produces a report setting out methodological issues and providing advisory recommendations. For instance, advice may be given on PPE or otherwise practical approaches that are easily applied.

Regarding PPE, a JSP sets out a catalogue of PPE available, not necessarily what is needed. The EMT may wish to recommend an item not listed on the JSP but budgetary constraints can preclude the Unit commander from obtaining the equipment.

The Unit does not have to 'pay' for the EMT input. There is no outside contracting of consultants to meet the needs of Units as the EMT facility must be deployable and there are also language and attitude differences between civilian and military situations.

There is little in the way of routine monitoring performed. The only thing to be highlighted was lead monitoring of range officers, potentially exposed to lead in firing ranges. Even this situation is not clearly covered by the relevant regulations.

The responsibility for deciding whether occupational monitoring is required rests with the medical services. However, the difficulty lies in the great flexibility of military work — multiple tasks, great mobility, unusual working patterns, changing responsibilities with experience and promotion. Therefore, developing a personal 'job description' would be extremely difficult. An individual's job may change within a Unit and this may be known locally but not known at the personnel (AFPAA Worthy Down) level. Occupational monitoring data are occasionally 'personalised' but it is not the decision of EMT/AMD to define the population that the data represent.

Hard copies of the reports produced by EMT are archived (though there is no defined policy on this). Reports are available going back to 1976 (analytical work is available from 1980 onwards).

The EMT was visited for a second time on 15 June 2000 (see Section 2.4.4).

Other issues

Other discussions highlighted issues of potential importance.

- Divisional HQ may not necessarily be the central repository for files — they may be held at the branch level.
- The mobility of the Army means exposure scenarios are very complex.
- Travel documentation may be a potential source of data on an individual's movements.
- Units, particularly in operations, are frequently set-up and disbanded in a short space of time (e.g. Gulf War). Although there is a policy for Unit information to be archived, the lack of defined ownership of the information means it may not follow the approved archival procedures.

Documents provided

- Medical Administrative and Technical Instruction. *Communicable Disease Control Standing Operating Procedure*. MA&TI No. 66; 29 June 1999.
- Surgeon General's Policy Letter 4/97. *Communicable Disease Control in the Armed Forces*. 22 July 1997.
- F Med 85; Revised 3/97. *Notification of Infectious Disease*.
- Traveller software package output. *Journey Profile for Standard Adult Journey to Sierra Leone*.
- Army Medical Directorate letter (Ref: D/AMD/14/4; 4 April 2000). *Deployable Military Health Surveillance System — A Concept of Use*.
- HQ Land, G4 Operations and Plans. *A Commander's Guide to Health Safety and Environmental Risk Management*. Edition 1, December 1998.
- Medical Intelligence Cell, Army Medical Directorate. *Medical Intelligence Assessment: Sierra Leone*. As at 16 March 2000.
- Land Command Standing Order 3202. *Reporting of Incidents and Matters of Public Interest*. Second Revise, April 1998.

Further information available from: Army Medical Directorate
Keogh Barracks
Ash Vale
Aldershot
Hampshire
GU12 5RR

2.1.4 Defence Logistics Organisation, Directorate of Defence Logistics Safety

Date of Visit: **3 July 2000**

Introduction

The Directorate of Defence Logistics Safety (D Def Log Safety) was visited to gain an understanding of the influence of policy on the collection of exposure data. The ensuing visit report was returned to D Def Log Safety and the comments provided fully taken into account.

Prior to 1 April 2000 the D Def Log Safety was the Chief Environment and Safety Officer (Navy; CESO(N)) organisation. The CESO(N), on behalf of Chief of Fleet Support (CFS), interfaced with D SEF Pol on the development of MOD-wide environment and safety policy and determined how the policy would be implemented in the RN. The CESO(N) was also responsible for performance measurement, undertaking health and safety audits of the TLB Holders and Higher Level Budget (HLB) Holders within the RN and for providing a central focal point for advice and assistance on environment and safety matters. On 1 April 2000 D Def Log Safety came into existence as part of the newly formed DLO. The role of the directorate is to provide the principal SHEF focus for the DLO undertaking similar activities to those previously undertaken for the RN. Additionally the directorate undertakes a pan-safety co-ordinating role for the DLO.

As a consequence of the reorganisation of CESO(N), and the demise of CFS, the RN has formed a smaller Chief Environment and Safety Officer (Royal Navy; CESO(RN)) organisation within the CINCFLEET TLB, based at Her Majesty's (HM) Naval Base Portsmouth. This organisation will be responsible for policy formulation and performance measurement with the RN. For implementation support and competent advice, D Def Log Safety will support CESO(RN) under terms of a Customer Supplier Agreement (CSA).

Policy and organisation

The source of all MOD SHEF policy is D SEF Pol, which is headed by the CESO(MOD). D SEF Pol produces top-level policy that is cascaded down through the MOD focal points system to all areas of the Department. The Second Permanent Under Secretary chairs the DESB (formerly the Ministerial Safety Group) at which the Deputy Chief Defence Logistics represents DLO at three star level. Safety, health, environment and fire issues are dealt with by the SHEF Board (formerly DESC), where the DLO is represented at two star level by the Director General Operations and Business Development (DG Ops & B Dev).

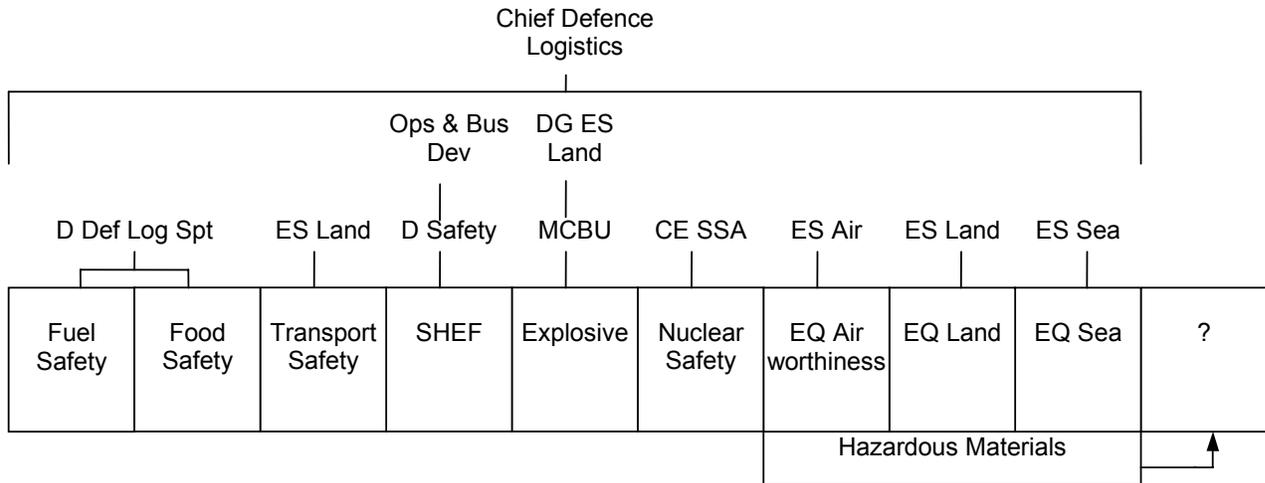
The DLO is organised into an HQ and eight business units, which are either Directorates General or Agencies. In order to facilitate the implementation of policy across the entire spectrum of safety within the DLO, a four star discipline lead has been identified for each functional safety area based on the expertise within each Directorate General or Agency (Figure 2.1). For example the Ships Support Agency (SSA) is responsible for nuclear engineering therefore the Chief Executive (CE) of the SSA agency has the four star lead for nuclear safety. The discipline lead for each functional safety area has the responsibility for producing an Organisations and Arrangements statement that covers the whole of the DLO. This is to ensure the risks from the particular hazard concerned are reduced to as low as reasonably practicable. Additionally each Director General or CE who has duty holder responsibilities in a functional safety area is required to produce an Organisations and Arrangements statement detailing how policy will be implemented within their own organisation.

Within the HQ organisation is DG Ops & B Dev to whom the four-star discipline lead for SHEF has been delegated. DG Ops & B Dev has produced a SHEF Organisation and Arrangements statement. Responsibility for implementation of SHEF policy resides with the line management chain. The DGs

and CEs are delegated the responsibility for implementation by personal letters of delegation. Subsequent delegations may be cascaded down the line management chain.

To demonstrate compliance with policy each Directorate General or Agency has to maintain sufficient records. This is augmented and checked by a system of annual audits and reports, which include statistics on the number of accidents, reportable accidents and number of individuals less than operationally fit.

Figure 2.1 Primary leads for environment and safety business areas within the Defence Logistics Organisation



CE, Chief Executive; D Def, Log Spt, Defence Logistics Support; DG, Director General; EQ, Equipment; ES, Equipment Support; MCBU, Munitions Central Business Unit; Ops & Bus Dev, Operations and Business Development; SHEF, Safety, Health, Environment and Fire; SSA, Ships Support Agency

With specific reference to exposure data, there are three areas that primarily influence the collection and retention of exposure data within the MOD.

- Legislation — Legislative requirements are examined by D SEF Pol which generates top level MOD policy. This is done in consultation with the Department for the Environment, Transport and the Regions* and the MOD TLB Holders, and will usually have some requirement to maintain records. The MOD is sometimes exempt from legislation; however, the Secretary of State for Defence still requires that departmental standards and arrangements are introduced which will be, so far as is reasonably practicable, at least as good as those required by the legislation. There is also increasing pressure from the HSE and the Environment Agency for Crown immunity to be removed.
- Business efficiency — the MOD does not want its personnel to be unavailable as a result of sickness (coincides with duty of care).
- Litigation and adverse publicity (e.g. Chatham dockyard workers claiming for radiation exposures).

Health and Safety Policy

The Health and Safety Policy section is primarily concerned with the development and implementation of health and safety policy within the DLO. As the DLO has recently formed from the

* Now the Department for Environment, Food and Rural Affairs

support elements of all three Services, policy guidance is contained in several different documents. For the first year of the DLO, Units and establishments will continue to use the policy guidance documentation of their former single Service (i.e. Book of Reference (BR) 9147 *MOD (N) Health and Safety Systems* for the RN, Air Publication (AP) 400 for the RAF and JSP 375 for the Army). The MOD-wide *Health and Safety Handbook* (JSP 375) is currently being re-written and is expected to be issued in April 2001. The DLO is contributing to the re-write and the revised JSP will form the DLO health and safety guidance. Audits of HLBs will take place on a SHEF basis with representation from the three SHEF sections. Health and Safety Policy is the lead section for audit. Audit will include examination of areas such as risk assessments, COSHH and noise assessments. Current guidance on the retention of risk assessments is that:

“Risk assessments relating to the work concerned need be held only for as long as they are current...” (JSP 375, paragraph 0833).

and,

“Risk assessments relating to an injury must be kept with the investigation report for five years from the date of the incident, after which they may be destroyed.” (JSP 375, paragraph 0834).

However, JSP 375 is currently being re-written, and will include revised guidance on the retention of records.

Environmental Protection Policy

The Environmental Protection Policy (EP Pol) section is primarily concerned with the development and promulgation of environmental policy within the DLO, ensuring that this reflects MOD-wide policy and is in accordance with European Union (EU) and UK law and International Protocols and Agreements to which the UK is signatory. EP Pol also provides advice and guidance to DLO business units in their role of implementation and enforcement of the policy. Services are also provided to CESO(RN) and Chief Environment and Safety Officer(RAF) (CESO(RAF)) under terms of CSAs.

If a pollution incident occurs a pollution report should be made in accordance with instructions in JSP 418 (*MOD Environmental Manual*) and BR8623 (*Oil Pollution at Sea Manual*). Maritime pollution reports are made in a standard signal format that includes details of the vessel, location, volume of pollution, nature of pollutant and actions taken to clean up the spill. EP Pol is an addressee to the signal to ensure that all appropriate action relating to environmental policy, including appropriate staffing through IPTs is completed. Land based pollution reports are free text, detailing incidents and actions taken including statements on the necessity of involving the Environment Agency or Scottish Environmental Protection Agency and the outcome. EP Pol should be a copy addressee on the report to add to the section’s knowledge base, to inform DLO-wide reporting processes to MOD centre and to ensure that all appropriate matters are staffed with Equipment IPTs.

Fire Safety Policy

All occurrences of fire incidents have to be reported using MOD Form 1059, 1060 or 1061. Major fire incidents (resulting in damage over £3000) are initially reported on MOD Form 1059 and detail the name of the Unit involved, name of the Unit responsible for the location, date, time, type of incident and cause, whether there were any casualties or fatalities and any special hazard details. The later may include chemicals, radioactive materials, ammunition, or hazardous materials. All major fire incidents are investigated using MOD Form 1061, which further investigates the cause of the fire, any casualties and equipment used. All other (minor) fire incidents are reported on the MOD Form 1060, which is a monthly return from all Units, whether there has been a fire or not.

Environmental Science Group

The Environmental Science Group (ESG) has responsibility for conducting land quality assessments of MOD sites of all three Services. Most of the work relates to decommissioned naval sites and the assessments are split into three phases that are described below.

Phase One

Phase One assessments are desk based assessments of each site, including research into the history of the site and interviews with knowledgeable site personnel. Each report concludes on the environmental sensitivity of each site, likely contamination and likely receptors. The decision to proceed to Phase Two is based on the Phase One report.

Phase Two

Phase Two assessments involve actual sampling of a site where it is suspected that there may be contamination, or that the situation may pose an immediate environmental risk. Samples can be from almost any medium (except air), for example, soil, sludge, water, sediment, and may be analysed for almost any contaminant, based on what contaminants are suspected from the Phase One assessment. The aim of Phase Two is to try and conclude what has happened at the site, and why contamination has occurred.

Phase Three

Phase Three consists of remediation, if the results of the Phase Two assessment indicate that this is necessary. However, it is up to the client to what action they take based on the recommendations of the Phase Two report. There is an emergency budget, though, if a situation poses an immediate environmental risk.

Reporting of Phase One and Two is to the client, and electronic and paper copies of the report are retained by the ESG and filed by site.

The ESG also carries out environmental risk assessments of sites. However, these are more at an operational level and are primarily concerned with the prevention of contamination, rather than actually detecting contamination. Reporting of the risk assessments is as for land quality assessments, although a database of reports is also maintained, giving a précis of each report and allowing searches by keywords.

Documents provided

- DLO Corporate Plan
- DLO 'Discipline' Focal Points at 18 Apr 00
- D Def Log Safety organisation
- DLO HQ Structure
- Extract from BR9147 (Chapter 4, pages 9, 10)

Further information available from:

Defence Logistics Organisation
Def Log Safety / HS Pol
Spur 9,
Beckford
Ensleigh
Bath
BA1 5AB

2.1.5 Chief Environment and Safety Officer (RAF)

Date of Visit: 11 July 2000

Introduction

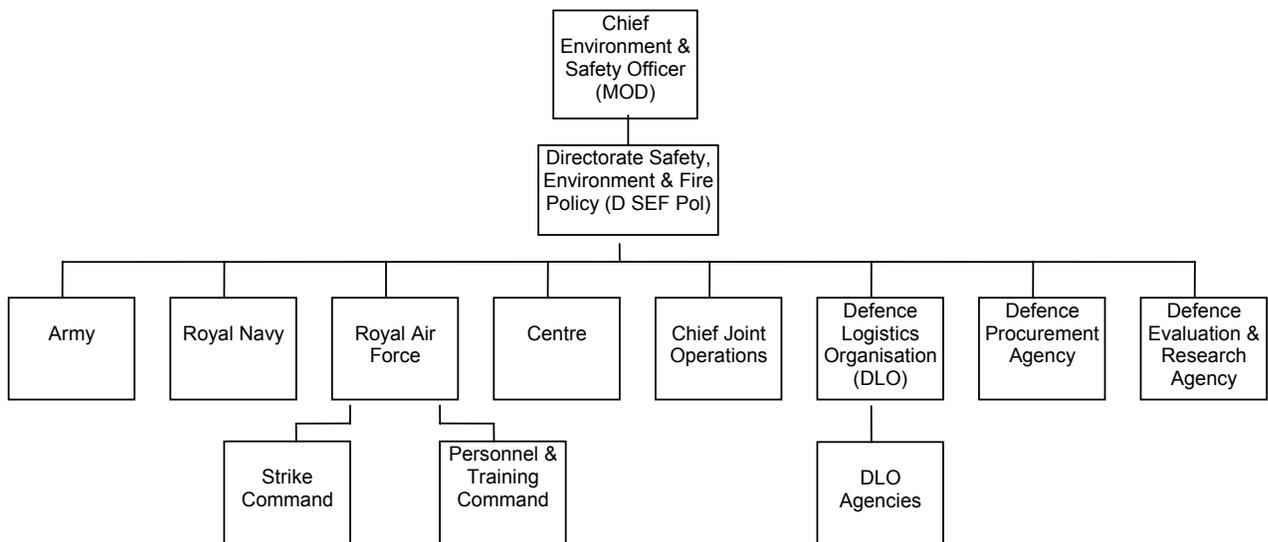
The purpose of the visit was to gain an understanding of the application of health and safety policy in the RAF. Following the visit a report was made and sent to CESO(RAF); however, no comments were provided.

Policy and organisation

The overall responsibility for health and safety in the MOD lies with the Secretary of State for Defence. The responsibility for applying the policy is, however, delegated to the TLB holders, who further delegate their responsibility through the line management chain to appropriate managers at every level.

The source of MOD policy on health and safety matters is D SEF Pol, which is headed by the CESO(MOD). Once agreed the policy is written into JSP 375, the *MOD Health and Safety Handbook*. This policy is then implemented within each TLB (Figure 2.2). The implementation of policy, however, may lead to differences in practice in areas such as record keeping since each TLB works under its own set of regulations, for example in the RAF health and safety is covered in AP 400. There is, however, an increasing emphasis now on standardising policy and practice throughout the TLBs.

Figure 2.2 Organisation of responsibility for health and safety among Top Level Budget Holders (TLBs)*



*The Army and Royal Navy are also made up of two TLBs: the Adjutant General and HQ Land Command for the Army, and the Commander in Chief of Fleet and the Second Sea Lord and Commander in Chief of Naval Home Command for the Navy. However, these are not illustrated here

The CESO(RAF) manages the implementation of MOD safety, health, environment and fire policy in the RAF. This is achieved by interpreting and incorporating new policy into AP 400, which is issued to all Units who then have the responsibility of implementing the guidance. This leads to the identification of hazards, and where necessary the production of risk assessments. The CESO(RAF) Branch also assesses the implications of new policy on the RAF and tries to influence the development of new policy through representation on the DESC (see organisational diagram provided).

The health and safety policy applies equally both in the UK and overseas. However, overseas operations may come under the responsibility of different TLBs depending on who is involved and the nature of the operation. For example if an operation involves more than one force it is the responsibility of Chief of Joint Operations, for example the Falklands campaign. Alternatively, operations with only single force involvement come under the responsibility of the individual force involved. For example RAF Strike Command has responsibility for the operations in Saudi Arabia and RAF Personnel and Training Command has responsibility for RAF Units based in Germany, Italy and Canada.

Responsibility for environmental health comes under the medical chain of command. However, there are many overlaps with the CESO(RAF) Branch.

Implementation of health and safety

Defence procurement

Contained within health and safety policy is the requirement that in the procurement of equipment and materials safety management is to begin at the outset and is to be carried through to disposal. Hence, for each procurement a safety case has to be produced detailing the hazardous materials used in the equipment, potential exposures, and how the procured item or material will eventually be disposed. This safety case follows the equipment or material throughout its service life, until it is no longer used by the Services.

Accident reporting

All accidents are reported using MOD Form 2000. However, this can be difficult to complete due to the large coding book (JSP 442) accompanying the form. The RAF have developed less complicated form for the initial data capture, which is sent to the Station Health and Safety Advisor who then inputs the information into the CHASP terminal. Every major station has a health and safety advisor who advises on health and safety matters at that station as well as at minor stations near by. It is thought that diseases are not always reported since medical personnel are not always aware of the need to report certain diseases under RIDDOR.

Risk assessments

Guidance from AP 400 should lead to the assessments of hazards, and where necessary, risk assessments. Current policy for the retention of risk assessments is only to retain current assessments unless there has been an incident. When a station closes down it is meant to send all current risk assessments to the CESO(RAF). However, there is no official policy on what should be forwarded and, to be useful, such historical risk assessments need to be accompanied by records of policy at the time the risk assessments were made. Unfortunately, such historical policy is usually difficult or impossible to track down.

COSHH assessments

Currently, COSHH requires the line manager to ensure that those involved in a particular process are not exposed to substances at a level that may damage their health. However, COSHH assessments are made for a process and not for individuals and, as with the other risk assessments, current policy only requires the retention of current COSHH assessments, unless there has been an incident. Medical surveillance is not routinely carried out, unless specifically required by the COSHH regulations. However, there are not many MOD personnel who work with hazardous substances requiring health surveillance under COSHH. The MOD COSHH forms are currently under revision.

Noise assessments

There are only three areas where statutory noise exposures are regularly exceeded: big guns, track vehicles and a third that was not noted. Health surveillance for noise is carried out according to AP 1269 (*Medical Administration Requirements for Audiometry*), with audiograms being given to

service personnel before, during and after their service. As with other risk assessments, noise assessments are made for a process and only current noise assessments are retained.

Asbestos

Asbestos use is very restricted in the MOD with some use occurring in brake linings for specialist vehicles. If an individual suspects they have been exposed to asbestos they can have this recorded on their personnel file using an Asbestos Notification Form (MOD Form 960). Where such incidents occur an EHT is usually sent to carry out monitoring.

The Defence Procurement Agency has the lead for the removal of asbestos from defence stocks. Additionally, each site has an asbestos register, which is maintained by the Establishment Works Consultant responsible for maintaining each site. The asbestos is checked on a regular basis and, unless it is absolutely necessary, the current policy is to leave the asbestos where it is since, undisturbed, it poses no immediate hazard.

Environmental protection

The responsibility for making environmental measurements usually lies with the Station, and is usually carried out to ensure compliance with discharge consents. There may be plans in the future to put together a register of discharge consents. Additionally, the MOD is carrying out land quality assessments of all MOD sites.

Documents provided

- *Health and Safety in the MOD*. A Policy Statement by the Secretary of State for Defence
- Annex 7G of JSP 375: MOD Occupational Health Committee
- Organisational diagram of Health and Safety Policy Committees in the MOD
- Winter 2000 Issue of *Safetywise & Ecology*

Potential sources of further information

- Senior Claims Officer, Room 824, Northumberland House
- Lead for Occupational Hygiene in the MOD (currently leading review of COSHH assessment forms)
- Staff at Abbeywood — responsible for asbestos removal programme from defence stocks
- Establishment Works Consultant — maintains sites according to set procedures

Further information available from:

Chief Environment and Safety Officer (RAF)
CESO(RAF) Branch
RAF Innsworth
Gloucester
GL3 1EZ

2.2 Personnel and pay administration systems

2.2.1 Armed Forces Personnel Administration Agency Worthy Down

Date of Visit: 27 March 2000

Introduction

The purpose of the meeting was to gather information on the pay and personnel records held for Army officers and soldiers. A draft of this visit report was sent to the Armed Forces Personnel Administration Agency (AFPAA) and their comments and answers to queries are included here.

The meeting began with a brief introduction about IEH's role in the Defence Evaluation and Research Agency (DERA) project. This was followed by a similar résumé of the role of King's College. A brief outline was then given of how data are gathered from the Unit level (UNICOM), through the Army Personnel Centre (APC), and then to AFPAA Worthy Down.

During subsequent discussions, two contrasting rationales behind the services offered by AFPAA Worthy Down/APC were summarised as questions of either manning the Army or knowing where people are. The current situation is that APC aims to man the Army and deal with personnel administration of officers and soldiers and is less concerned with establishing individual soldiers'/officers' locations. Essentially, postings are handled by APC, and they ensure respective Units are manned to the required strength (liability).

Pay and manning are, and historically have been, separate. The essential reason for this is the difference in approach between the two roles. Pay needs to be timely whereas manning issues are not so time dependent. However, the two functions will be combined from 1 April 2001. From that time, pay will be based on the individual, what they do, and what they have achieved (i.e. training and qualifications).

In contrast to other armed services, the Army operates with more scattered Units, rather than the ship or aircraft based approaches of the Royal Navy (RN) and Royal Air Force (RAF). Movements tend to be Unit-based, but there are also movements of individual troops, specialist Units or individual replacements to consider within the broad picture of tracking personnel. Whereas the Army takes an approach of equipping manpower, the other Services man equipment.

In the afternoon AFPAA plans to establish a tri-Service facility, rather than the current single-service system were outlined. At present, information on the data held in each respective system is being gathered with the aim of establishing a base dataset that is common to all Services. It will be important that the same information means the same thing (and is used for the same purpose) across the Services. Any data fields that need to be added to this new tri-Service system (i.e. as a result of this project), should be made known to AFPAA so that they can be included in the new design.

Record of Service

The Record of Service (ROS) is the central part of the AFPAA Worthy Down system (a copy of the data fields for officers and soldiers was provided to IEH). There are 'fixed' and 'variable' portions within the ROS, designated by a letter prefix to the field (F or V). The ROS is stored electronically for perpetuity. When the soldier/officer has no reserve value left their 'P' file (from the APC) is sent for archiving at Hayes, Middlesex.

The personnel record for each soldier/officer starts from the point at which they officially joined the Army (i.e. in the recruitment office). Training Administration and Financial Management Information System (Recruitment) (TAFMIS(R)) forms are sent to APC from which the ROS is established. AFPAA Worthy Down holds the data and is responsible for data input and any changes to the ROS.

When a soldier/officer leaves the Army, their ROS is kept live until the end of their reserve life (which varies depending on their length of service and other criteria). Information on the individual's next-of-kin are 'pruned' from the ROS when they leave.

All data on the ROS go through a validation process and a master file check is performed every month. This involves comparing the parameters for each field with the stored fields and thereby identifying erroneous entries.

Army Project 3

Army Project 3 is a system of booking in and out of theatre and therefore may be relevant in that it will ultimately give person locations, that is it is a field support system which aspires to track soldiers/officers day-to-day in theatre. The aim is for AP3 to link with the general personnel data systems. In contrast, information in the AFPAA Worthy Down system may not be specific to individuals, but rather to the Unit level (i.e. it would be possible to say where a Unit was and who should be with that Unit, with the caveat that detachments etc. may affect the answer). The aim of AP3 is to have a system 'in theatre' whereby it is possible to say where a soldier/officer is or was.

The ROS does not hold a great deal of information of specific postings at the moment. The hope is that each mobile Unit when in theatre will transmit data back to APC/AFPAA Worthy Down but there are hardware needs and difficulties to overcome before this happens.

As noted above, the ROS holds some medical data. Work is going ahead to store information on vaccinations on the ROS, which will be finished by October 2000.

Medical Services Database

This holds some information on injuries, but its aim is more to deal with medical liability following discharge.

War diary

All Units maintain a 'war diary' and radio message log during operations. The war diary is maintained by the adjutant on behalf of the Commanding Officer and provides the 'big picture' about each operation — location, mission. The quality of war diaries is variable and they are stored by Unit archives.

The Unit

Much of the discussion during the meeting centred on information at the 'Unit' level but it was unclear exactly what was meant by a Unit. In the context of AFPAA Worthy Down (i.e. in terms of data flows), the Unit refers to the input arriving at the mainframe from a UNICOM system. A UNICOM system may administer one Unit (a battalion) or several Units (as at Worthy Down). On the UNICOM system, the structure is such that an individual is held down to a section level (e.g. a group of eight people). On the mainframe the individual is held on a Unit Identity Number (UIN). This number can refer to a battalion, company or even a platoon, depending on the make-up of the Unit. It is unusual for the UIN to go below company level but it has happened (e.g. with independent Royal Engineer Units).

Documents provided

- PowerPoint slide summary of pay data input systems
- Varfield block titles
- Example of soldier and officer ROS

- Example output from Individual Enquiry System (officer/soldier current/previous locations)
- List of files passed to the Defence Analytical Services Agency (DASA) for statistical purposes
- Manning and mobilisation systems instructions no. 289; capture, hold and provide data to AP3. Version 1.0 MMSI 289

Potential sources of further information

- TAFMIS
- Corporate Personnel Database
- Project RYAN
- MCM Technical Services Wing

Further information available from: Directorate of Staff and Personnel Support (Army)
Worthy Down
Winchester
Hampshire
SO21 2RG

2.2.2 Unit Computing System (UNICOM)

Date of Visit: 24 August 2000

Introduction

The purpose of the visit was to gather information on UNICOM. A briefing note was provided giving a short history of information technology in the Army that supports pay and personnel administration on which the majority of this report is based. Further information gleaned during discussions and demonstrations is also included. A previous draft of this report was sent to the staff involved and this version incorporates comments received and answers to queries. A copy of the UNICOM data dictionary was provided to IEH.

Background and history of pay and personnel administration support in the Army

Every Unit has always had personnel whose speciality is administration. The Royal Army Pay Corps has provided support for well over a century — this Corps is now part of the Adjutant General's Corps. Up to the advent of World War II, each Unit's administrative staff kept records for every individual in that Unit. They recorded their pay entitlements and basic details of their service (i.e. when enlisted, when due to retire, what qualifications, married or single etc.).

After World War II ended, National Service saw a huge increase in the Armed Forces and Regimental Pay Offices (RPOs) were formed to perform some of the functions carried out by Unit administration staff. At the same time, Manning and Record Offices (MROs) were also formed and these offices managed the careers of the individual officer and soldier. However, all records held by RPOs and MROs were manual and Unit staff informed these offices of all events affecting the officer and soldier.

RPOs calculated pay entitlement and Unit administration staff paid the individual and then notified the RPO who deducted the payment and carried forward the balance to the next month.

There were about 14 RPOs and each RPO looked after a number of Units; likewise with the MROs. However, the RPOs and MROs were not co-located, for example a Royal Engineer had his RPO in Brighton and his MRO in York.

In the mid-1960s, it was proposed that all pay and personnel records should be held on a mainframe and this idea came to fruition in 1967. The proposal was justified by savings as it was proposed that several RPOs and MROs could be shut and those remaining could be re-located. The first computer centre was located at Worthy Down. At that time the mainframe calculated pay and informed Units by means of a printed pay statement. However, any changes that had to be made to the individual's record were notified to the RPOs by means of Army Forms or publication of a Unit order and then these data were input by RPO staff. The input was batched and the mainframe record updated on a daily basis.

As the success of the mainframe became more and more evident, so more programs were written to accommodate pay for the TA and calculations of pensions for the Regular Army. The personnel side also developed programs to hold personnel data for the Regular and Reserve Army.

In the late 1970s, it was proposed that Units, which still kept manual records, should have a computerised system and this was duly introduced in the early 1980s. This system was able to record changes and produce the input which when batched would update the mainframe record. However, only a small number of processes resulted in Unit-produced input. Each night the RPOs would pull data from the Units that they administered and send it to the mainframe. This first system produced Unit orders for all of the non-automated processes that were then input by the respective RPOs and MROs.

With an ever-shrinking Army, coupled with the advent of the computer, it became inevitable that eventually there would be a single, co-located RPO/MRO and a Unit-based system capable of automating all pay and personnel functions. UNICOM is that system and the APC at Glasgow is the single RPO/MRO. AFPAA Worthy Down operates the mainframe on which resides the pay, ROS, pension and other 'flat file' records.

UNICOM

Before UNICOM was established there was a process of identifying the Unit needs for the system (through the Total Unit Information Needs Study). Each Unit commanding officer chose the particular location for their UNICOM; local system administrators set up individual privileges. UNICOM is only allocated to Units (a number of Units comprises a Brigade; in turn, a number of Brigades form a Division) although everyone in the Army has their record on a UNICOM system somewhere. For instance, staff at the Brigade and Division level are co-located with a Unit and their records are maintained within that Unit's UNICOM. There are also small 'outposts' such as embassies that do not warrant their own UNICOM; such individuals are administered through the Global Regimental Administration Office at APC. There are just over 400 UNICOM systems issued, the roll out of the system having been completed in 1995. UNICOM can and is deployed operationally and every UNICOM system is linked to the mainframe and can send data to other UNICOM sites.

The functionality of the Army is split into three areas:

'A' — pay and personnel administration (sponsored by Directorate of Staff and Personnel Support (Army) (DSPS(A));

'Q' — all aspects of stores, accommodation and rationing (sponsored by the Defence Logistics Organisation (DLO)); and

'G' — training and operations (no defined sponsor identified at Headquarters (HQ) (Land)).

UNICOM provides software in support of all these areas. The 'A' area is the only one that had Unit computing prior to the introduction of UNICOM in 1994. UNICOM therefore replaced the old system but the other two areas had software introduced for the first time. The attitude towards UNICOM and data completeness varies across these three areas. In 'A' area, pay and personnel data MUST be kept and maintained on UNICOM. For 'Q' area, until recently the approach to UNICOM was *ad hoc* but there is now an 'encouragement' to use the system. For 'G' area, UNICOM is poorly utilised. The degree of use in 'Q' and 'G' varies across Units.

In 1986, all pay and personnel administration for the three services (Army, RAF and RN) was contracted out to an external consultant (EDS) on a 12 year contract. The three mainframe sites are known as AFPAA (see also visit to AFPAA Worthy Down, Section 2.2.1)). AFPAA Worthy Down is responsible for a vast number of programs to calculate and issue the pay for all Army personnel. However, pay is just one of many functions that the mainframe supports. The APC at Glasgow is responsible for the maintenance of records held on the mainframe. The APC is also responsible for the posting of personnel, promotion and other day-to-day managerial tasks. It is incumbent on the APC to ensure that the records on the mainframe are correct at all times.

There are various organisations that manage the soldier, or hold and maintain records to which others need access to manage the soldier, and they all have access to the records as held on the mainframe. The primary responsibility for individuals rests with the Commanding Officer (CO) of the Unit in which the individual is serving. There are internal and external agencies to assist the CO in managing individuals (Table 2.1). None of them has access to the UNICOM record. The career managers need to access mainframe records to determine whether a person can be promoted and where he can or cannot be posted.

Table 2.1 Internal and external agencies providing assistance to the Commanding Officer to manage individuals

Internal	External
Regimental Administrative Officer	Schoolchildren's Education
Army Welfare Officer	Chaplains ^a
Housing Welfare Officer	Army Legal Services ^b
Medical Officer	Career Management ^c

^a Normally attached to a Brigade Headquarters and cover all Units within that Brigade;

^b Located at Brigade

^c Each Corps has its own career management section located at the Army Personnel Centre which is responsible for promotions and postings

There are differences between the types of data held on the UNICOM and mainframe systems. For example although Units hold information on private vehicles, the mainframe is not interested in this type of data. The mainframe holds information on pensions, which is not held on UNICOM as once an individual has left the Army they are of no interest to the day-to-day management of the individual Unit. However, there are many data items that are common to both systems and it is important that both systems have identical data.

Units record events as they occur and if these data items are also held by the mainframe then the UNICOM software creates an occurrence that is sent to the mainframe, which does a batch update every night. If an occurrence rejects, the APC is responsible for investigating the reason for rejection and the resolution of the problem.

There is a compare program that enables the common data items to be checked and a number of set procedures to correct any mismatches.

UNICOM information fields

UNICOM holds information on a very broad range of areas (from notification of casualties to personal equipment holdings). The main menu headings are as follows:

- Personnel
- Unit planning
- Training management
- Equipment management
- Stores management
- System management
- Data capture
- Management information menu
- Unit accounting
-

UNICOM hosts information on such data as clothing, training records, personal information (medical, dental, vaccinations) next of kin (in the Army three next of kin are required for married personnel, two for single), qualifications, medals, pay details, punishments, pensions, leave. A copy of the data fields for UNICOM was provided.

An individual's Service Record holds information on courses, qualifications, rank, posting (employment categories which change as the soldier advances through the Army), theatre (enplaning and deplaning), honours, medals and awards, education. In general, data are held on the mainframe and in UNICOM for the period that the individual is in the Army and are passed from Unit to Unit on posting. UNICOM, unlike the AFPAA, does not retain reserve records. Posting and theatre information is kept in perpetuity by AFPAA Worthy Down. It is difficult, without a more detailed assessment of the UNICOM system, to define exactly which information is held for how long. Retention can be defined by military policy (e.g. a Company Conduct Sheet for being drunk and

causing a disturbance is deleted after 2 years free of further entries). Where rules exist, these are embedded in UNICOM software.

The posting information tells the mainframe which budget holder administers that particular individual. Vaccination information (and date) is held locally on UNICOM but until recently was not sent to the mainframe. UNICOM only holds information on the date of the primary and reinforcing vaccinations. Since our visit, UNICOM has created a brand new module for vaccination details. AFPAA Worthy Down is now required to hold vaccination details (a vaccination code is passed to AFPAA Worthy Down as a UNICOM occurrence; other data include batch identification, administration date, due date for renewal).

When an individual moves to another Unit, nearly all information held on their local UNICOM is transferred to the new Unit. The individual's duties at the old Unit are deleted as is information on their workplace. Because UNICOM allows users to enter their own 'Unit use fields', it is difficult to define exactly which data are or are not transferred on posting.

UNICOM Out of Barracks

When a Unit is deployed it is assigned one of around 40 ruggedised UNICOM computers (the Unit either gets its own UNICOM Out of Barracks (OOB) or shares with another Unit in the same place). Each Unit's records are transferred and training is given in its use. As and when personnel begin to return from their posting, they can be 'trickle' posted back into their home system. Like UNICOM in barracks, there is a daily back up of all data on the UNICOM OOB. The main difference is that during operations administrative tasks will tend to take lower priority (updating non-essential information such as bank account details will not be seen as important).

Location information

Each location 'theatre' has an identifying number which is set by the DSPS(A); HQ Land notifies all concerned that troops are required to serve in a particular area through an Arms Plot. The same codes must be used on both UNICOM and the mainframe. Each Unit is responsible for informing the mainframe where and when an individual is in a specific location. Every time someone departs, for no matter how long, there is an entry even if there is no change to the theatre, only to the UIN. For detachments, the Personnel Administration Manual stipulates that only periods greater than 21 days should be reported; this is a remnant of the manual data handling process and there are plans to revisit this rule. Other sections within UNICOM hold information on transport and pay that may cover location information for detachments less than 21 days in duration.

UINs are set by Analytical Service Division 2 (ASD2) of the Department of Social Security (DSS) in London. Although theoretically a UIN may be re-used, because AFPAA Worthy Down must keep a record of each Unit and theatre an individual has been posted to, then re-use cannot occur for many years.

A query tool is available that may be used to identify individuals on the mainframe by their location, rank and other fields. It is also possible to set up search parameters and send them to each UNICOM and get information sent back. Individual Units are not able to query another Unit's data.

When a Unit is deployed a rear party is left. This is assigned a Bravo UIN while the deployed Unit is the Alpha UIN. The Bravo Unit has in effect 'moved' according to its posting while remaining at the same location. Each Unit must send a 'change of location report' to let all other Units know where it is located (e.g. to HQ (Land) and APC). HQ (Land) maintains information on where all Units are at that time on the 'Arms Plot', a paper-based (?) and highly classified record. Units tend to move approximately every five years. Individual officers within Units tend to be posted every two to three years for career progression/development purposes. Attached staff (clerks, administration, mechanics etc.) are also posted every two to three years. Soldiers generally stay with the Unit for the duration of their career and move only when their Unit moves.

The Army Service Department manages the assignment and maintenance of UINs. It holds a UIN database giving each Unit's current 'address'. The UIN is 'static' information for UNICOM that gets updated three or four times a year.

Medical data

Medical data are held by both systems. All Army personnel have access to free medical services and most Units have their own medical centre. However, there is not a one-to-one relationship between medical centres and Units, there being fewer medical centres than Units. This lack of a one-to-one relationship causes problems with maintenance of medical records on UNICOM. Where the Unit has its own medical centre, the personnel there maintain the record. Where individuals attend another medical centre, that centre may not have access to the individual's UNICOM record. Therefore, they must pass the individual's records to his Unit's central administration office so that the record can be updated. This is not wholly satisfactory.

The Director General Army Medical Services (DGAMS) is responsible to the Armed Forces Minister for all policy/procedure relating to medical and dental details. When UNICOM was under design, the problem of the lack of a one-to-one relationship between medical centres and Units resulted in little support for the UNICOM concept from DGAMS. The preferred solution was for medical centres to operate their own systems. However, unlike UNICOM, none of these systems can send data to the mainframe and thus UNICOM holds the basic medical data and transmits this to the mainframe. It could be possible to overcome the lack of one-to-one relationship between medical centres and Units by linking terminals at each medical centre via a wide area network.

The net result of medical centres operating two systems is double entry or forgetting to update one of the systems (usually UNICOM). Where medical centres have to send documents to a central administration office, someone from the medical centre still needs to check to see whether the work has been done. There is therefore an unnecessary administrative burden placed on Unit personnel. There are plans to have a common hardware infrastructure across the Army upon which will reside all software. This could well alleviate the existing problems.

DGAMS issues policy via PULHHEEMS (Physical capacity; Upper limbs; Locomotion; Hearing (left and right); Eyesight (left and right); Mental capacity; Stability (emotional)). All Army personnel are subject to regular checks during which their PULHHEEMS is assessed. There are eight degrees of grading under each of the qualities above and these are denoted using a numerical value (1–8). On entry into the Army, the initial assessment must be above a certain standard and new recruits can be discharged if they fail to reach this standard. In theory, because all applicants to join the Army have a medical examination before enlistment, most of those failing to reach the standard will not be allowed to enlist. There are varying standards depending on the Unit an individual wishes to join. For example a helicopter pilot must have good eyesight but the standard for an administrative clerk would be lower. When an applicant joins the Army, the minimum physical standard for enlistment is assessed. On joining the Army, the minimum physical standard for the Unit he wishes to join is assessed. If a potential helicopter pilot is found to have defective sight, then that person is offered employment in another trade. The individual does, however, have the right to be discharged from the Army.

A PULHHEEMS assessment has a Physical Employment Standard (PES) code attached to it. This information is held on the mainframe at Worthy Down. Those responsible for posting and promotions have access to this code as they determine whether or not a person can be posted to a certain area and whether or not they can be promoted.

For example an individual assessed as physically fit can be posted anywhere in the world and can be promoted if found suitable. If the individual breaks a leg, his medical centre adjusts his PULHHEEMS and PES code. The posting branch is unlikely to post that individual until his leg has healed but there is no reason why that individual cannot be promoted.

If later in life, the individual develops diabetes, the PULHHEEMS pamphlet directs the medical centres to grade the individual as 'home only'; anyone graded thus cannot be promoted.

Where an individual is admitted to a civilian hospital (for instance after a road traffic accident), the Army medical authorities will automatically downgrade that individual. The mainframe computer will be notified of the fact that the individual has been admitted to hospital and that he has been downgraded. If an individual is in hospital for more than 71 days, then the individual gets posted to a special list maintained by the APC. The original Unit will get a replacement as nominated by the postings branch of APC. The mainframe does not include any information on why an individual has been downgraded.

No matter where an individual is posted, his record goes with him. That record will contain medical and dental data. If an individual is detached to another Unit for a short period of time (for instance to attend a course) then the record will also go to the Unit hosting that course. When a record is sent to another UNICOM, it is copied and the losing system record is marked 'C' (Copy). Access to the copy is restricted. The gaining Unit has the master and must send an acknowledgement to the losing Unit to say it has received and imported the data successfully. Once acknowledgement is received, the copy is deleted. If no acknowledgement is received, the housekeeping software will delete the record after one year.

In wartime the Army operates an out-of-barracks computer system. Records are imported on that system so medical data are available both in peace and wartime scenarios (see UNICOM OOB above).

Vaccination data are also held on UNICOM and now are also held on the mainframe. Vaccinations used to be governed by time and all Army personnel were required to have all vaccinations on entry into the Army and thereafter based on time. The current process is an 'as needed' system. UNICOM also holds dental data but the mainframe does not. Dental condition can have the same effect on an individual's career prospects and it is the responsibility of dental agency staff at Unit level to advise the APC postings branch if an individual is required to have major dental surgery over a protracted period. There is no intention in the near future for the mainframe to be tasked to hold dental data.

Individual's National Health Service (NHS) numbers are held on mainframe for officers only. Blood group is only held on UNICOM, not the mainframe.

Establishment data

Each Unit has its own 'establishment', a set number of specific personnel. UNICOM holds information on the establishment number, establishment title, effective date, sponsor, edition number, peace/war indicator, status indicator, UIN and affiliated UIN. Manning Divisions are responsible for ensuring that each establishment is filled by posting personnel to that Unit.

UNICOM interfaces

UNICOM interfaces with:

- mainframe at Worthy Down
- Stores System at Bicester (from early 2001, this will do electronic ordering. The Field Equipment Management System is run by Store System 3 at Bicester. Each item has a unique North Atlantic Treaty Organisation (NATO) Stock Number (NSN); the Units are provided with the NSNs for around 2000 of the most common items (shirts, boots, etc.)
- Project DRUMM (a new project for asset management that will be handled by UNICOM)

There are proposals/plans for UNICOM to interface with:

- The Training Administration and Financial Management Information System (TAFMIS(T))
- Egton Medical Information System (EMIS; either within UNICOM or as an icon link to a separate system)

UNICOM outputs

UNICOM produces reports that were originally paper-based forms (e.g. punishments, marriages). There is an annual (actually twice per year) verification print for the DSPS(A) that is sent to each individual soldier/officer for checking and verification (e.g. next of kin information). A full record report can be printed as requested.

Data accuracy and validation

Some data fields will only accept data of a certain type (e.g. alpha-numeric such as A###A). UNICOM can validate some fields by comparing them against a set format (e.g. for postcodes).

Documents provided

- List of medical details held within UNICOM (13 October 1999)
- UNICOM data dictionary

Further information available from: Unit Computing (UNICOM) Project
Worthy Down
Winchester
Hampshire
SO21 2RG

2.2.3 Armed Forces Personnel Administration Agency Centurion

Date of Visit: 18 April 2000

Introduction

The purpose of this visit was to gain an understanding of the information and systems used by AFPAA Centurion. The visit report was returned to AFPAA Centurion and the report amended according to the comments received.

Royal Navy personnel and Service Numbers

The RN includes RN personnel, Royal Marine (RM) personnel, and formerly included the Women's Royal Naval Service and the Queen Alexandra's Royal Naval Nursing Service (these have now been integrated into the RN). For both RN and RM, those holding a commission are called Officers. In the RN, non-commissioned personnel are called Ratings; in the RM they are called Other Ranks (ORs). At the top end of the Ratings/ORs structure are Warrant Officers (WOs) (who hold a Warrant). The structures are defined in the Queen's Regulations for the RN, which are based on Acts of Parliament.

All personnel have a unique Service Number (there is no re-allocation or duplication of numbers). Service Numbers for Reserves differ from those for regular service personnel, and Service Numbers for officers differ from those of Ratings/ORs. If a Reserve joins the regulars or a Rating/OR becomes an Officer, they will be allocated new Service Numbers.

Reserves

All personnel in the RN are volunteers. They join up on an engagement (commission for officers), which defines their conditions of service, including their length of service, for example Ratings join on an OE1, which is a 22 year engagement. They can end their naval service before the end of their engagement by giving notice. Part of the conditions of service is that they have a reserve liability at the end of their engagement under the Reserve Forces Act (RFA; either RFA80 or RFA96). This means that they can be recalled in the event of hostilities, etc. They do not have to do any training, etc. Sometimes they volunteer to come back and work for the RN.

There is a different set of people who also carry the title Reserves. They are also volunteers, but normally have not been in active service (although some of them are ex-active service). They do have a commitment to do regular training with the Reserves (drill nights, two weeks full-time each year, etc.). They also work under the RFA (currently RFA96). These Reserves are paid.

Units

From the point of view of AFPAA Centurion, a Unit is a discrete entity into which an individual can be posted. Some of them are quite small, some quite big. The smaller Units do not keep their own records — they are not self-accounting Units — the larger Units do; they have a Unit Personnel Office (UPO). The smaller Units rely on a larger Unit for their UPO (e.g. the personnel at AFPAA Centurion are handled by Her Majesty's Ship (HMS) Nelson UPO). The bigger UPOs have recently been fitted with the Personnel Administration System (PAS; see below), which permits Units to pass data electronically to AFPAA Centurion. Without PAS all inputs to AFPAA Centurion have to be submitted on a Computer Form (C-Form) and are keyed in manually. This was the historic method of entering all data. In peacetime there are about 500 to 600 Units; however, in war the number of Units increases since new Units are formed to meet operational requirements.

Pay and the Naval Manpower Management Information System

AFPAA Centurion has two main functions: to pay service personnel and to provide a system to underpin the posting of service personnel (the Naval Manning Agency (NMA) does the actual posting). There are several computer systems within AFPAA Centurion; however, the key ones are

Pay and the Naval Manpower Management Information System (NMMIS). The systems are used for both Ranks and Ratings, although data files for Ranks are likely to contain more detailed career management information than those for Ratings.

Pay involves paying regulars and reservists and calculating pensions (payment is done by the Paymaster General). It is also used to send financial data to the financial and budgetary systems used by higher management to control the Defence Budget. Although there are four separate software systems (active service pay, reserves, pensions and financial and budgetary information) they are all hosted on the same mainframe.

NMMIS is used for manpower management. Although its primary task is the matching of a man to a job vacancy (or future job vacancy) so that he can be posted, it is used for a number of other purposes as well. It holds details of all jobs, both current and future in the RN, so is used to plan up to ten years ahead for numbers, skills etc. With the huge amount of data it holds on a man, it is also used for career management and a few extras (electoral registration details, next of kin data etc.). data are fed out to several authorities, for example DASA, for them to produce statistics.

Pay is hosted on an ICL mainframe and its basic structure dates back to the late 1960s. It is a flat file, with data sorted by data group, that is each type of data goes into a separate data group so that there is a data group for current rank and another one holding all previous ranks. Data are entered to Pay by one of two means. The older method is to use a C-Form, which is completed by a UPO and sent to AFPAA Centurion for coding and manual typing into Pay. The more recent method (rapidly becoming more widespread) is through PAS. Effectively this provides an electronic C-form, which can be completed by a UPO and sent to AFPAA Centurion electronically. PAS is used by self-accounting Units and also holds some data on the man himself. It is slowly being used for purposes beyond its original task of being a feeder system to Pay. PAS is primarily concerned with active service personnel, although it is being fitted in reserves Units.

Pay contains a broad range of data affecting the pay of each service person and reservist, most of which is very accurate (people are often quick to highlight errors relating to pay). The Pay system includes a record of an individual's geographical movements, recorded by means of a Movement Occurrence Report (MOR), since an individual's allowances are affected by which Unit they currently belong to (e.g. individuals do not pay for food and accommodation in a sea going Unit, but do on shore Units). MORs are raised to alter the main Pay record and keep the individual's allowances up-to-date. The MOR indicating arrival at one Unit/location should match that showing their departure from a previous location; however, this does not always work in practice. MORs are used in both operational and peacetime situations; however, in operational situations MORs are unlikely to reflect an individual's true movements, since in such situations paperwork is not a high priority. The data extractions for the Gulf War used MORs, but the data was both conflicting and incomplete. Furthermore, MOR action will not be taken for short periods away from a parent Unit (up to 24 hours?) or for movements which do not effect pay, for example movements between minesweepers in a Unit, or a Chaplain moving from ship to ship, while based on a parent ship. MORs for ratings are likely to be more accurate than for officers, since MORs are raised on behalf of ratings, whereas officers are supposed to complete the forms themselves. Pay also contains a posting history (drafting for ratings, appointing for officers), which is a record of Units an individual has been posted to, and the date of their postings. However, this may not reflect an individual's true geographical location.

Interrogation of the Pay system (or NMMIS) is possible, and is frequently done to answer questions from many authorities. For example it is possible to identify who exactly was posted to a particular ship on a particular day, or to identify what the MOR record states, or to identify all Artificers who have served in a particular submarine. Before AFPAA Centurion will release data, it has to obtain approval under the Data Protection Act from the Data Controller. To extract this type of data requires the writing of specific computer programs.

NMMIS is another database, updated from Pay (by tape), from PAS, from the Reserves database (not within Centurion) and on-line by Drafters and Appointers and contains files for Reservists as well as regular service personnel. Although NMMIS shares about 90% of its data with Pay, it does not contain a record of MORs. Current information in NMMIS can be searched using any number of fields. However, a specific query program has to be written in order to query historical data.

In addition to Pay and NMMIS, each individual will also have a Personal Record File (PRF), held at Centurion, which contains copies (or originals) of certain legal documents, for example the individual recruitment form.

When an individual is discharged, their Pay record is moved to the Discharge file and is then archived 18 months post-discharge. The archived file is then kept for seven years, for tax purposes, but is heavily weeded, and at ten years post-discharge only contains minimal information (information on movements and posting to Units is removed). NMMIS files, however, are printed at discharge and placed in the individual's PRF, which is then sent to Hayes for archiving; however, this has only been happening for the past two to three years. The NMMIS files are archived at the point where a man/officer has no further reserve liability. The archive records are held on tape and a stub record is retained (see below).

An individual's Service Certificate (SC) is held on board their Unit, together with his detailed employment record (History Sheet). These data are not held on board for officers. The SC is a handwritten document and records details of all postings, Hurt Certificates issued and their medals and promotion records (but not their detailed movements as in MORs). If a Unit is sunk, an individual's SC (but not their History Sheet) can mostly be reconstructed from data held at AFPAA Centurion. When a Rating leaves the Service, they are given their SC and History Sheet. These provide a basic record of their employment for them to pass to a new employer. A copy of their SC goes into their PRF and a copy is retained at AFPAA Centurion for 75 years, after which it is sent to the Public Records Office (PRO). The Unit personnel file is also heavily weeded at discharge (in accordance with a manual which lists what is to be retained or discarded) and the remaining papers are passed to AFPAA Centurion to go in the individual's PRF.

Pay and NMMIS are not linked to any other systems, nor are there any plans to create any linkages. Data extracts, however, are sent to DASA on a monthly basis.

Manning and job descriptions

Each Unit has its own Scheme of Complement (SoC), which is a list of every job, by rank/rate, specialisation, additional qualifications, etc. The NMA uses this SoC to determine the posts that it has to fill with the correct people, trained and qualified to fill the posts. As yet, full job descriptions are not available, although there are plans to introduce them*. Details of the work undertaken by each Rating are recorded on the man's History Sheet – this information is not passed to AFPAA Centurion. However, how an individual is employed is ultimately at the Unit's discretion, although an individual's generic trade is usually identified in their rank, for example Petty Officer Radar.

Souls on Board list

Each ship at sea maintains a Souls on Board list, which is a list of those currently on board according to their name, rank and number. The list is used as a checklist should a ship go down, in order to be able to account for everyone on board. The list is updated to AFPAA Centurion every time someone leaves or joins the ship, and updates are initiated by a movement taking place. Once alongside a signal is sent to AFPAA Centurion to terminate the list. A new list is then started when the ship sails again, and the old list is completely deleted to avoid any confusion with the current list.

*Job descriptions are currently being developed; however, this is probably more to benefit Ratings when they leave, rather than to provide an accurate history of tasks carried out

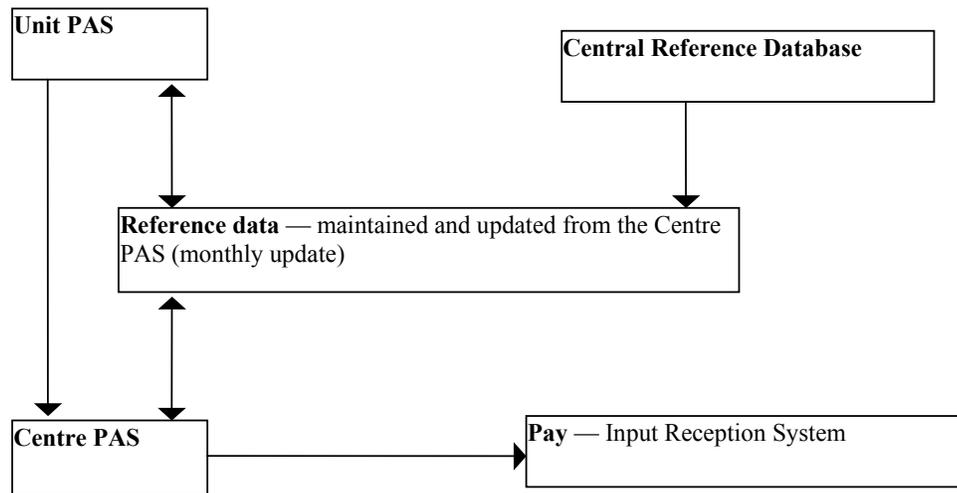
Personnel Administration System

The PAS (Figure 2.3) is a relatively new system (development started in January 1999) that has been released to a small number of shore bases (9) and ships (7). The next phase release will go to 62 self-accounting Units and will be completed by November 2000. The PAS has three main aims:

- to transfer C-Form pay entitlements to the central pay administration;
- reduce errors (i.e. by having checks at the Unit level rather than later in the process, and by having cross-field checking); and
- reduce delays (e.g. there is no need for a floating Unit to be in port to send information; the updates are made via e-mail attachments).

The PAS automatically updates and makes changes to the pay record and provides an audit trail (there are two levels of checking within the Unit before it is dispatched to the central PAS database).

Figure 2.3 Data flow Between the Personnel Administration System (PAS) and other systems



Within PAS C-forms, there are both mandatory and optional fields. If a mandatory field is not complete, an error message is returned. The C-form fields are set by the Reference data and in that way all Units are working to the same set of criteria. Each Unit may have a particular set of C-forms depending on whether it is a floating or shore-based Unit. Updates from the Unit to the central database are scheduled by the Unit, but are usually sent at the end of the day.

Later releases of PAS will replace the current paper-based pay, leave and travel management systems with an electronic system. The next release will also manage the Souls on Board information and will include other information on personnel such as their living-out address and additional Unit record fields.

Further into the future, it is envisaged that PAS will manage Long Service at Sea bonuses, the Ratings and Other Ranks Reporting System (RORRS) and provide an electronic SC. RORRS is a Unit-based system running for the last 6 to 8 months that manages personnel data. The Unit receives a download from NMMIS and it is then the responsibility of the Unit to maintain and update the database.

Therefore, the Units are essentially populating two databases — PAS and RORRS — which future releases of PAS aim to eliminate.

Discussion on the identifications of naval personnel in the Gulf War

For an exercise on the identification of naval personnel in the Gulf War, the Naval Historical Branch (NHB) produced a list of where each Unit was at certain dates. Using the Unit identification code the individuals were identified using mainly the NMMIS system as the old Pay records and, in particular, the most useful section, the MORs, may have been stripped when archiving occurred. It was mentioned that, in fact, this deleted material was actually archived, but in practical terms, would be very difficult to retrieve. The quality of the movement records was sometimes vague. In particular during operation the record might only state, for example, ‘detached duties’ rather than specify a more detailed location. There are discussions going on about the possibilities of keeping some permanent data files relating to particular conflicts of potential future concern, for example, Bosnia. The system would automatically flag up every time a movement mentioned Bosnia and transfer the permanent record. The reason for doing this rather than suggesting keeping all data are the huge size of these computer record systems — a fact not appreciated by many. It was pointed out, for example, that it takes several hours to do the current pay run. This sort of problem will be even greater for the Army, which has 110–120 000 people serving as opposed to 43 000 in the RN.

The ship status file was mentioned, which identifies where ships are at any time. Pay uses this to address pay statements. However, it is unlikely that this is kept historically.

It was also mentioned that there might be some Units, such as the Special Boat Service (equivalent to the Special Air Service), for whom it is improbable that AFPAA Centurion would be able to identify individuals.

Document provided

- Format of Service Number

Potential sources of further information

- Department of Naval Manning Policy — developing job descriptions for ratings, and involved in the Ratings and Ranks Reporting System
- Chief Executive Ships Support Agency, Foxhill, Bath BA1 5AB — contact to find out about Engineers Ready Use Store on ships
- Ship’s status file

Further information available from:

Armed Forces Personnel Administration Agency
Centurion Building
Grange Road
Gosport
Hants
PO13 9XA

2.2.4 Armed Forces Personnel Administration Agency Innsworth

Date of Visit: **13 March 2000**

Introduction

The aim of the visit was to gain an understanding of the information systems used by AFPAA Innsworth for personnel data. A draft of this report was sent to AFPAA Innsworth and all the suggested amendments were incorporated in this report.

A staff member working in Administrative Strategy and sponsoring the data on RAF personnel, a specialist on the mainframe system holding the RAF personnel data and the information itself, a staff member at AFPAA HQ and a consultant in occupational medicine advising the whole of the RAF were contacted.

AFPAA organisation

The primary function of AFPAA is to assess the correct pay and pension entitlement for service personnel and store information so as to be able to identify who is currently fit for service/deployment. Currently AFPAA has a central HQ and three individual Service sites. However, in about three weeks time, this will be re-organised and AFPAA will have a Head Office and four functional Directorates: Strategy, Development, Operations, and Personnel and Finance.

AFPAA Innsworth and AFPAA Centurion are both the Data Centres and Administrators for the RAF and RN, respectively. The Data and Administration Centres for the Army are split between AFPAA Worthy Down and the APC, Glasgow.

Personnel records

All service personnel in the RAF are assigned a Service Number. This number is unique to each individual and consists of seven digits and a letter. The position of the letter at the beginning or end of the number indicates whether the individual is an Airman or Officer, respectively. RAF Service Numbers are not duplicated (or if they are this is picked up quickly), nor are they re-assigned.

There are three main personnel records retained on individuals:

- Current computer record
- Backup paper folder (Personal Dossier — including correspondence, medical correspondence, records of postings and deployments, etc.), although this may not be the same as the computer record
- Appraisals — career management (appraisal information is also held on the computer record and the Personal Dossier)

Additionally, there are paper copies of each individual's medical records, which are retained indefinitely.

The RAF computer personnel records are made up of numerous fields, each of which may contain several data items. For example the Postings field contains data items such as:

- Date in Unit
- Unit Establishment Number
- Unit Identification Number
- Posting Identification Code (PIC)
- Post Code (reason for posting)
- Command
- Post Information
- Rank
- Job Number
- Aircraft Type

Certain fields in the computer records are mandatory, one of the reasons being that they have to be completed in order that the correct level of pay can be calculated; the system will not accept the record if they are not completed. Other fields are optional — this can mean that they are either genuinely optional (does not really matter whether the data are collected or not) or that the field is not applicable. The number and types of fields differ for Airmen and Officers.

The computer records are updated as and when it is necessary. The fields vary as to whether they are over-written when they are updated or whether the information previously in the field is archived. For example next of kin, dental fitness and posting dates are overwritten each time the field is updated although some overwritten fields, for example dental fitness, may be recorded on paper elsewhere. Other fields, such as posting, are archived, although there may be a limited number of entries that are archived, for example the previous five entries.

Individuals are given the opportunity to see personnel records at any time; however, it depends on the individual whether they choose to read and correct information. There is a tendency for the information relating to pay to be highly accurate, since individuals have a vested interest in the accuracy of such information. For the remaining information, the initial data capture is the key element determining its accuracy.

Since the mid-1960s records have been retained on computer, and hence it is possible to carry out *ad hoc* computer searches. All computer personnel and pay records are archived when someone leaves the service.

Prior to the introduction of computerised records, the hard copy personnel records of Airmen are retained for seven years after the last entry; after this they are destroyed; an A3 summary, however, is retained indefinitely for each Airman (this may change under the new Data Protection Act, which may result in all records being retained). The records are stored according to Service Number and surname and so a query on an individual is relatively easy. However, a query on a group of individuals, for example a Squadron or those involved in a campaign, is much more difficult; this requires an intensive manual search of records according to the Service Numbers in use at that time, of which there may be tens of thousands. These kinds of searches are carried out by the Disclosure Department.

The hard copy personnel records of Officers are retained indefinitely including Annual Appraisals. Pension files are retained for 99 years for all Service personnel; however, these files only record the minimum necessary for calculating pension entitlement.

Links between personnel and health systems

There is some linking between the Medical and Dental Primary Health Care and AFPAA Innsworth mainframe. The AFPAA Innsworth mainframe writes to and receives information from Unit medical systems, known as Station Administration Management Aid. Basic personnel data can be fed from the AFPAA Innsworth mainframe to the medical system. Limited medical data are fed to the personnel data system. This is at a pilot stage.

Until now, only NHS numbers for Officers have been recorded on a routine basis. However, it is intended to obtain these for all new recruits in future. NB There is currently no plan to store Airmen's NHS numbers on the mainframe computer.

COSHH assessments are usually carried out by line managers with support from a full-time Station Health and Safety Officer. There is no direct linkage between COSHH assessments and individual personnel records. The assessments are likely to be held at Section level, but it is not known whether the old assessments are retained or discarded, following a new assessment.

Postings, job histories and deployments

In general, RAF personnel are posted to fixed locations and the posting recorded in their mainframe record and Personnel Dossier (fixed deployment). If a Squadron is deployed it is usually assumed that everyone in the Squadron goes, although some individuals may be on detachment or sick leave and hence not deploy. It is also possible to post individuals (non-fixed deployment). The system is reasonably efficient in recording individual postings, but, it is possible for individuals to be moved by a Station and it not be reported (although this is rare). Normally, individuals are provided with a drafting note, which will tell them where they are going. If working on aircraft, the type is shown for Airmen who are Corporals and above. A copy of this note will be filed in the Personal Dossier.

The role of an individual or job carried out during a posting can usually be ascertained from the PIC, which identifies the Unit and job. PICs have only been allocated for Airmen since 1997. However, how an individual is employed at a Station may be decided by the Station Commander. Specific information on what an individual may have been doing day to day is not recorded.

Each individual has a trade and generic job title and this, combined with 'corporate knowledge' (i.e. knowledge retained by service personnel), may be sufficient to identify roughly what a particular individual did. For example if an individual was an Aircraft Technician in 111 Squadron during the 1980s, it is possible to say they would have worked on Phantom FG1 engines. There is much of this corporate knowledge, but it is only available for about the past 10–15 years and is not officially recorded. An individual's training record, or annual appraisal may also provide useful information on their job. (Note: this is a paper record and so will be discarded for Airmen seven years after leaving.)

Currently, deployments are controlled through RAF Innsworth. Requests for deployment are made to RAF Strike Command, who allocate Squadrons to the deployment. The Squadron then decides who exactly will be deployed and this information is loaded on to an Operational Management Information System (OMIS), and the data simultaneously fed back to the Personnel Management Agency (PMA). This is referred to as a Formed Unit Move. The situation is more complicated when the Unit is made up of individuals from different Units. This is called a Non-formed Unit Move and is controlled by the PMA, which decides who is deployed and loads the information on to OMIS.

If a Unit is to be deployed, the RAF (in theory) use a Deployed Administration Group which has the task of tracking individuals on deployment. This is done using a Theatre OMIS (TOMIS) terminal, which is linked to the parent system at RAF Innsworth.

Generally, the PMA is only interested in who is in theatre if they start taking casualties. Where an individual is on a day to day basis only needs to be known by the parent Unit, and may not be recorded.

The problems encountered in identifying where an individual is or was at a particular time, are similar to those that arise in the issue of medals. The most reliable data held by AFPAA Innsworth are at Unit level. Manual records would be needed to obtain more detail of day-to-day movements. On operation more may be stored on paper records, but these are likely to be destroyed at the end of the tour.

Documents provided

- Copy of blank and complete Airman's personnel summary card
- Information on the fields and data items held in the AFPAA Innsworth/PMA system
- Copy of document about retention of records and their condition

Potential sources of further information

- Air Historical Branch, Old Scotland Yard, London
- AFPAA Worthy Down Staff member familiar with the 274 information systems in use

Further information available from: Headquarters Personnel and Training Command
RAF Innsworth
Gloucester
GL3 1EZ

2.3 Medical records

2.3.1 Surgeon General's Department

Date of Visit: 7 June 1999

Introduction

The Surgeon General's (SG's) department is a policy-making directorate for the Defence Medical Services. Within the department there are four separate directorates:

- medical programme and plans, responsible for equipment and information strategies and long term planning for operations;
- defence and nursing service;
- medical, finance and secretariat whose work includes dealing with parliamentary matters; and
- medical personnel, training and policy.

The SG's department oversees the three departments within each of the separate services who have responsibility for primary care, public health etc.

The problem of Gulf War Syndrome etc. was originally addressed by the SG and the Gulf Veteran's Illness Unit was set up later. The SG felt that the main problem was a lack of records, both non-existent, incomplete or cumbersome. The SG is at present developing an Information Strategy regarding health surveillance. A central policy is also being developed to record all people deployed to a particular operation although this will not yet attempt to link with other records, for example medical. Other systems being considered are a 'Pay as you Dine' swipe card.

The SG is not directly involved with Health and Safety. There is a separate central Unit for this, which liaises with the Health and Safety Executive (HSE). Compliance with health and safety legislation within peacetime falls with this group. However, in an operational situation the responsibility is much more *ad hoc*.

A discussion was held about 'soft' health end-points such as musculoskeletal problems. Sickness absence records are analysed regularly — these tend to be from training injuries and upper respiratory problems. In peacetime major occupational health problems are not very prevalent partly because of health and safety but partly because selection is so stringent that many potential recruits are screened out during training.

Potential sources of further information

- Central Health and Safety at St Giles Court
- Institute of Naval Medicine (INM; particularly for occupational hygiene group)

Further information available from:

Surgeon General's Department
MOD Main Building
Whitehall
London
SW1A 2HW

2.3.2 Army Medical Directorate

Date of Visit: 24 June 1999

Introduction

After general introductions, a short presentation was given on military health surveillance systems. IEH was also given a copy of a Commanders Guide to health, safety and environmental risk management. In non-operational situations the line manager has ultimate responsibility for accepting the risk assessment. The definition of a cohort study is often very difficult due to the mobility and flexibility of the armed services. Health outcomes such as medical discharge, medical downgrading, retirement and death are readily available.

How does the Army differ from the other services? Not only is it bigger but it is also mainly land based and the jobs and tasks carried out are much more varied. The Army Medical Directorate (AMD) takes a lead in Public Health and also has the greatest number of Environmental Health Officers (EHOs).

Environmental health

Environmental health monitoring will be activated:

- through routine need, for example lead;
- at the request of safety officers;
- at the request of an HSE enforcer; or
- after an advisory visit from the environmental health group.

Routine monitoring is not generally carried out.

The environmental health reports are either narrative reports or standard risk assessment or Control of Substances Hazardous to Health (COSHH) forms are used. They are hoping to introduce a computerised audit system — SCHASE — Aston University Audit system. They feel the lack of access to information technology is one of the limitations to the Army improving its record systems.

It was pointed out that there may be different chains of commands within one site. The dominant one will be the budget holder. The Army Web site is useful for getting information about this.

A discussion took place about the monitoring of a landfill site adjacent to an Army station that was carried out in Bosnia. Even if no high levels of substances or health-related problems are found a decision about the station is not necessarily made.

Most monitoring is site or task specific rather than personal.

Staff at AMD are also responsible for disease and environmental health, disease vector profiles and medical capabilities in countries in “which we have an interest”. An Environmental and Industrial Hazard (EIH) report is produced for these countries before the Army goes in. The EIH is confirmed by informed reconnaissance by the EHOs. The emphasis is a qualitative rather than quantitative assessment.

PULHHEEMS

Another presentation was given, this time about PULHHEEMS (Physical Capacity; Upper Limb; Locomotion; Hearing (left and right); Eyesight (left and right); Mental Capacity; Stability (emotional)), the fitness for work medical system.

Primary health care

A talk was given about the J97 primary health care record system, which is a monthly return of counts of attendances at all medical centres. The causes are coded (although the cause of injuries are not separated out from the actual injury).

Summing up

It was suggested that IEH talks to the Fire Service; the Department of Health; health and safety within the Services; the training, accident and investigation team; the Army personnel department.

Further information available from: Army Medical Directorate
Keogh Barracks
Ash Vale
Aldershot
Hampshire
GU12 5RR

2.3.3 Director of Health, HM Naval Base Portsmouth

Date of Visit: 25 June 1999

Introduction

There are three groups of people that the Navy Medical Service is concerned with:

- uniformed personnel;
- uniformed Royal Marines (RM's) (work closely with the Army); and
- civilians.

There also are a few reservists. It is necessary to be aware that the 'ownership' of the various parts of the service is very diverse. However, the Medical Service tends to be organised according to function or geographical area. On the civilian side, health and safety, including occupational health services, tends to be patchy but the Royal Navy (RN) would like to include them all in this project. A future plan for the end of their financial year is to have an integrated primary care medical service (General Practitioners (GPs)/Occupational Health/Environmental Health/Public Health) for all three Services under the SG. The SG will also maintain four agencies.

- Defence Secondary Care Agency
- Defence Dental Agency
- Medical Supply Agency
- Defence Medical Training Organisation

Royal Navy Primary Care

This starts at recruitment at which the same standard medical Joint Service Publication (JSP 346), is used as for the other Services. In addition the medical will cover requirements for special RN jobs, for example divers etc. Local area GPs do the examinations. There is then a routine medical at 30 and at regular intervals thereafter. The Navy Medical Service uses the same F Med forms as the other services.

The age distribution at recruitment is 16–32 with most being at the younger ages. The average service is less than 9 years.

Risk assessments are carried out by Naval Health Inspectors and are the responsibility of the line managers. In addition to normal occupational health situations they will also consider wider environmental issues, for example water quality, food hygiene. The RN is also open to inspections by the HSE, and Local Authority organisations such as food and hygiene inspectors. The RN uses the same COSHH and risk assessment forms as the other services and also carries out audits. The RN has the primary health care information system EMIS (Egton Medical Information Systems) in nearly all shore Units (F Med 4). On deployments the whole record is taken (NB The RMs follow Army procedures.)

There are approximately 16 specialist occupational health consultants and 12 training posts with a network of civilian occupational nurses.

The main areas needing special health surveillance include: radiation, diving, aviation, submariners, sonar operators, Merchant Navy, isocyanates, asbestos, noise, welding, spray painting, lead. If a worker needs special surveillance this is recorded on F Med 143.

Parallel industries include: maintenance and shipbuilding, merchant shipping, food industry, nuclear industry, industrial diving, oil exploration.

Also mentioned was the North Atlantic Treaty Organisation (NATO) epidemiology working group that is aiming for commonality between NATO countries. A minimum data set (name, date of birth (DOB), Service Number, where people are) should have been agreed at SG level.

Occupational health

A meeting was held with an Occupational Hygienist and an Occupational Health Nurse.

The occupational health group acts as adviser and carries out hygiene surveys if necessary, mainly for COSHH. It has carried out routine measurements on two projects, wood dust and isocyanates in Bostik. A lot of teaching is done for people carrying out COSHH assessments and auditing. These assessments are kept at the place of work but in some areas there is a computerised register of them.

Any monitoring measurements are recorded in a standard hygiene report and should be always be kept. The main measurements are air monitoring, noise and thermal comfort monitoring. Mostly the monitoring is for compliance purposes, for specific tasks or jobs, that is to see whether controls are working. The group tries to monitor normal or typical working practices rather than exceptional circumstances. Personal protective equipment (PPE) is also recorded. The group would be able to locate its records easily by establishment and date but not by substance. It does not get involved in operational situations, although except in wartime, the hygienists at INM may have carried out some.

The staff suggested that parallel industries would be light engineering, involving metalworking, woodworking, painting, electronics and training institutions. IEH should also talk to Fleet Health Office and INM.

Further information available from: Director of Health
Room 34
Old Naval Academy
HM Naval Base
Portsmouth
PO1 3LM

2.3.4 Directorate of Primary Health Care, RAF Innsworth

Date of Visit: 28 May 1999

Introduction

During peacetime the Royal Air Force (RAF) is directly comparable with the aviation industry in that much of the work involves maintenance and heavy engineering, with various support services. COSHH risk assessments have to be carried out in this situation.

Personnel records will hold an outline career profile, including postings and dates of postings. Although each job has a specification, individual records may not be detailed enough to indicate exact jobs. Each RAF station has its own historical documents that may be passed to the Air Historical Branch (AHB). Medical records are kept forever. There is also an electronic system (Primary Health Care Information System) for medical records.

Each station has a health and safety officer — usually a civilian — and a health and safety committee. There is a six monthly health and safety audit. During operations the responsibility is given to military staff. Occupational hygienists (environmental health technicians) are the responsibility of the Occupational Physicians. No routine monitoring is carried out, except when a problem arises or at the start or change of a process. The hygienists are based at RAF Halton.

Medical fitness

There is a routine medical on joining and after that at various intervals. Special cases such as aircrew, or those with special exposures such as painters, receive more regular medicals. Each time data on smoking, alcohol consumption, exercise, etc. is recorded. The computerised medical records system can be linked with the personnel system. There is also a computerised accident reporting system that is collated centrally for all three services.

Potential sources of further information

- Central Health and Safety Group
- RAF Health and Safety Brampton
- Environmental Health Technicians, RAF Halton
- Aviation Historical Branch
- RAF Personnel records department — RAF Innsworth
- Records departments at Strike Command and Logistic Command
- Merchant Navy

Further information available from: RAF Innsworth
HQ PTC
Gloucester
GL3 1EZ

2.4 Occupational exposure and environmental monitoring data

2.4.1 DERA Radiological Protection Service

Date of Visit: 21 June 2000

Introduction

The DERA Radiological Protection Service (DRPS) provides a Health and Safety Executive (HSE) licensed radiological dose record keeping service for the whole of the Ministry of Defence (MOD). About 65% of its customer base is from the Army, Royal Navy (RN) and Royal Air Force (RAF), with the remainder coming from outside civilians and private customers. The purpose of this visit was to gain an understanding of the dosimetry record keeping service DRPS provides. This report was returned to DRPS and comments received fully taken into account.

Registration of service personnel

Personnel who are routinely exposed to radiation require routine monitoring and have to register with the DRPS approved dose record keeping service. DRPS also provides a statutory radiation protection advisory service to the MOD. For service personnel, the onus is on the Commanding Officer (CO) of the Unit to determine who should be monitored. However, it is customary that the advice of the Radiation Protection Adviser is used as the basis for this decision. Registration is done by completing a *Personal Details Form* (F Med 291E; provided), which records information on the individual, the Unit and Establishment and the kind of work they are performing. If National Insurance (NI) or National Health Service (NHS) numbers are not provided on the returned F Med 291E, the Unit will be requested to obtain this information from the individual. If this information is not available, the relevant service personnel agency will be contacted. However, NHS numbers are rarely received. Additionally, if an individual has previously been occupationally exposed to radiation, then a Transfer Record is requested from the relevant approved dose record keeping service and details are entered into the individual's dose record. The Transfer Record lists the individual's personal details, their life dose, their dose over the last five years and gives a more detailed breakdown of their dose for the current calendar year. Thus DRPS obtains a complete dose record for an individual's working life and maintains it until they leave the service.

Radiation monitoring

Depending on the type of radiation work involved, radiation doses are measured using either external personal dosimeters or by internal dosimetry, all of which DRPS is licensed to carry out by HSE. There are several types of external dosimeter to measure different types of radiation and at different sites of exposure.

Thermoluminescent dosimeters (TLDs)

TLDs are used to measure whole body dose and whole body skin dose to beta (β), gamma (γ) and X-rays. Doses to extremities can also be monitored using special small dosimeters strapped to the extremity, for example fingers or hands, and are used where the dose received by an extremity, is likely to be substantially higher than that received by the whole body. Whole body TLDs have been issued to all nuclear submariners since 1992.

Neutron dosimeters

CR39 dosimeters are currently used to assess neutron radiation doses. These have been issued to all nuclear submariners since 1994 and other service personnel, as the work required. Historically,

neutron dosimeters were issued to a small number of service personnel where their work was assessed as having the potential for them to receive significant neutron doses.

For internal dosimetry, DRPS provides HSE approved, radon, tritium-in-urine and whole body monitoring:

Radon dosimeters

DRPS provides personal and environmental radon monitoring services using CR39 detectors. Very few service personnel have a requirement to be monitored for personal radon exposure (some Army potholing instructors).

Tritium dose monitoring

Urine monitoring is used to assess exposures to tritium. Most of the positive exposures occur in civilian personnel involved in de-luminising equipment. There have been very few positive tritium dose assessments made for service personnel.

Whole body monitor

DRPS operates an HSE approved whole body monitoring service. The facility is primarily used for nuclear accident response purposes where in the unlikely event of an accident there would be potential for many people to become significantly internally contaminated. The whole body monitor consists of a series of gamma ray detectors situated above and below a couch on which the person requiring monitoring is situated. The detectors can assess the quantity and type of material inside the individual's body and this information can be used to derive a dose assessment. The whole body monitor is rarely used to assess routine exposures to personnel (a few civilian dockyard workers).

Internal monitoring, however, is usually only carried out when there has been a suspected intake as a result of an accident or, in the case of tritium, an individual is chronically exposed to low levels. For those chronically exposed to tritium (civilians only), urine analysis is carried out on a monthly basis.

Issue of dosimeters and record keeping

The DRPS approved dose record keeping service currently holds over 69 000 dose records dating back to the 1950s. A high proportion of these records relate to service personnel. It is current MOD policy for those personnel not registered with the DRPS dose record keeping service to have their dose records maintained indefinitely by their parent Unit. For those records held by DRPS, copies of records are held in paper, microfiche and/or microfilm format in addition to being stored on optical disk. Dose records for personnel that have been monitored since 1979 are also held on a live Oracle database.

Each calendar quarter customers are provided with Radiation Dose Record Summary Reports (RDRSRs) for all personnel monitored at their establishment during that period. It is a MOD mandatory requirement for these records to be maintained on site until the person either ceases employment or transfers to another Unit. It is customary for the RDRSRs, together with any other appropriate information, to be filed in F Med 291A (*Radiation History Envelopes*) envelopes.

Dosimeters are usually issued to establishments on a monthly basis and are dispatched with an Issue List that details the serial numbers of the dosimeters issued, together with the names of the personnel known to require dosimetry for that period. Once monitoring is complete, the dates the dosimeters were worn are completed on the issue list, and the dosimeters returned to DRPS for analysis. The dosimetry results are recorded in each individual's dose records and a Laboratory Certificate is issued to each Unit, summarising all the Unit's dose assessments for that period. If a dosimeter is lost, damaged or cannot be read then a *Provision of Estimated Doses* form, ASD94/1, has to be completed and sent to DRPS to ensure a complete dose record is maintained for each individual. At the same time as raising the Laboratory Certificate, Warning Reports and Over-exposure reports are raised for

personnel who have exceeded any pre-determined dose threshold over a specified period. Statutory dose limits and related Investigation Levels are detailed in the Ionising Radiation Regulations (1999) and MOD mandatory levels are specified in JSP 392 *Instructions for Radiological Protection* (ADS22/6 contains a list of current limits and levels).

If a Unit requiring dosimetry is deployed, it is up to the Unit to anticipate their dosimetry needs and advise DRPS of their requirements for the deployment. DRPS will then supply the Unit with their required dosimeters to the field. When an individual no longer requires routine monitoring or is posted to another Unit, this is indicated on the issue list and returned to DRPS, which removes their name from the issue list. Similarly, if an individual requires dosimetry at their new Unit, this is also indicated to DRPS on the issue list (see ASD22/6 for details); DRPS adds the individual to the new Unit's issue list.

DRPS does not keep records of environmental monitoring; this is the responsibility of the Unit or Establishment.

Classification of personnel

Personnel exposed to radiation can be designated as either classified or unclassified persons. Classified persons are radiation workers deemed to have the potential to exceed three-tenths of the appropriate statutory dose limit. Classified persons have to have an annual medical which is recorded on a F Med 291C form, *Radiation Medical Examination*, a copy of which should be sent to DRPS and stored in the individual's F Med 291A, or, for RAF personnel, in their F Med 4. However, this is not always the case since some medics do not consider it appropriate that DRPS holds medical information. There is a statutory obligation for dose records relating to classified persons to be maintained by an approved dose record keeping service (such as that provided by DRPS) for a minimum period of 50 years or until the person reaches age 75, whichever period is greater. However, it is MOD policy to maintain dose records for all radiation workers indefinitely regardless of classification.

If a person has ever been classified a PD2 label is attached to their F Med 291A or their F Med 4. This label informs the Unit that there is a requirement for a Termination Record to be raised for that individual when he or she ceases employment (see below). Currently <10% of MOD radiation workers are classified; however, about 50% of radiation workers may have been classified at some time.

If a classified person has to work at a non-MOD establishment in a radiation controlled area, there is a statutory requirement that they are supplied by DRPS with a Radiation Passbook. This is similar to the RDRSR and gives details of their annual radiation dose to date and the date of their last radiation medical. This is necessary in order that the individual be allowed access to the radiation controlled area.

Individuals can be declassified if they stop radiation work or continue but receive a very low dose. When an individual is declassified, the employer or CO writes to the individual notifying them of the declassification.

Termination records

When an individual who has been a classified radiation worker leaves the service it is a statutory requirement that a Termination Record is raised. This is initiated by the individual completing another F Med 291E, indicating they require a Termination Record and providing a forwarding address, and returning the form to DRPS. The Termination Record contains the individual's personal details, when they began and finished radiation work, their lifetime dose, their dose over the past five years and a detailed breakdown of their dose for the current calendar year. Copies of the Termination Record are sent to the individual and the HSE's Central Index of Dose Information.

Documents provided

- F Med 291E(Rev 2000) *Personal Details Form*
- ADS22/6 *Guidance Notes for Completing the Dosemeter Issue List*
- ADS27/3 *DRPS Personal Dosimetry Lecture Notes*
- ADS94/1 *Provision of Estimated Dose Form*
- Personnel Dosimetry Record
- Personnel Information Request letters for each Service

Potential sources of further information

- JSP 392 *Instructions for Radiological Protection*

Further information available from: DERA Radiological Protection Services
Crescent Road
Alverstoke
Gosport
PO12 2DL

2.4.2 Medical Operational Planning

Date of Visit: 5 May 2000

Introduction

The staff member visited is at present working in the Surgeon General's (SG's) Department in the Medical Operational Planning Section, in particular in the nuclear and biological warfare and medical intelligence group. The Section is responsible for anticipating the health and environmental hazards likely to be encountered when the armed services go on operation. They build up profiles relating to what is known about the country regarding climate, infectious diseases, Environmental and Industrial Hazards (EIHs) etc, and recommend medical countermeasures.

His previous post was as an Environmental Health Officer (EHO) in Northern Ireland (a UK Operational Command). He is thus very knowledgeable about the structure of environmental health in the three armed services. The Army and RAF have both fully (civilian) qualified EHOs and Environmental Health Technicians. In the Army an EHO would be appointed at divisional or regional Headquarters (HQ) together with a team of technicians to act as environmental health adviser to a command. In the RAF EHOs are present at command positions, with Environmental Health Technicians at stations. The RN only has EHOs.

In Northern Ireland, the contact had a team of three EH technicians who visited each Unit (typically a battalion of 600, but could be much smaller) on a regular basis (monthly, yearly) to audit the health and safety practice and recording of that practice. A computer database has been developed to record all the information from the visits. The database is based round generic Control of Substances Hazardous to Health (COSHH) requirements but could be expanded to include audits for specific substances.

Some of the discussion held with the Directorate of Safety, Environment and Fire Policy (Section 2.1.1) was reiterated in that D SEF Pol has produced a health and safety document which is largely a synopsis of the UK legislation and gives little guidance as to how this is implemented at local level. The development of local policy will vary greatly as will the implementation, partly depending on the qualifications and skills of the people involved. It was felt that the policies did not really address the issue of the form in which health and safety data should be collected. Nor were there firm retention and archiving policies.

Potential sources of further information

- Army Medical Directorate

Further information available from:

MBC/INT/SO2
MOD Main Building
Room 8119
Whitehall
London

2.4.3 Defence Logistics Organisation, Equipment Support (Land), Hazardous Materials

Date of Visit: 18 July 2000

Introduction

The purpose of this visit was to gather information relating to the identification and classification of hazardous materials. A draft of this report was forwarded to the primary contact asking for comments and corrections; none has been received.

The Defence Logistics Organisation (DLO) is a tri-Service organisation that went 'live' in April 2000. One of the staff members contacted is responsible for the identification and classification of all hazardous materials that are held in the stores inventory for Equipment Support (Land). This is not necessarily only Army-related information but relates to equipment used on land as opposed to sea or air. A copy of the *Materiel Regulations for the Army, Volume 9, Hazardous Material, Pamphlet Number 1, Classification and Provision of Safety Data Sheets* was given to IEH.

Hazardous materials

Hazardous material classification is based on regulations and information from the manufacturer. If any material is classified as dangerous goods for the purposes of transport, the responsibility lies with IEH's second contact to advise on its transport (see below). One of the problems that is encountered in dealing with hazardous material identification and classification is that individual Units often buy-in materials on an *ad hoc* basis. For instance, while waiting for a delivery of toilet cleaner, a quartermaster may use the Unit credit card to purchase a replacement, which may behave differently in the local infrastructure or in the environment. In such circumstances, some quartermasters send Material Safety Data Sheets (MSDSs) to DLO but the majority do not, which means there may be gaps in the dataset the DLO holds.

For newly supplied substances, staff become involved when the contract for supply is let. Each contractor/supplier is asked to provide a defined dataset as explained in Defence Contracts 68 (copy given to IEH). This is basically a blank MSDS so most contractors merely send a MSDS plus any supplementary information (a copy of such a submission was given to IEH). Initial identification of the materials is the main issue. At the moment over 9000 items have been identified and classified on the Hazardous Stores Information System (HSIS; copy of CD-ROM given to IEH). Each new version of the CD-ROM includes a list of entries that are new or changed since the previous version. There are approximately 12 'live' terminals from which to access the live database — two at DLO and others at the Institute of Naval Medicine (INM), the Centre for Aviation Medicine, D SEF Pol and Foxhill.

The HSIS system was established in 1994/1995 to replace the previous, outmoded system for disseminating safety data. HSIS is an electronic system with the majority of data entry being contracted to ICL, the contractor that designed and set up the system. As outlined above, MSDSs for each substance are obtained from the manufacturer. DLO checks that the sheets are legible, scans them and stores the scan electronically and then sends the MSDS to ICL for actual entry into the system. Once returned from ICL, original MSDSs are archived at DLO. As soon as a new MSDS is received, an entry is made on HSIS by DLO to form an auditable trail from receipt of the sheet to its entry on HSIS. The sheets are checked for accuracy by comparing them with an MSDS from another supplier of the same material or from another source (e.g. literature). As well as the data supplied by the manufacturer, the system allows additional information to be added to the record such as 'Not for RAF use' or to give further advice on specific sections. Once entered into the system, a record cannot be deleted but can be superseded by a new MSDS. Thereby, MSDSs will remain available for materials whether or not the supplier still exists or the Unit uses old stock, for instance.

The information is sent quarterly on a CD-ROM of which 3000 copies are made and distributed. The CD-ROM and information on it is MOD copyright; contractors who need the information are given hard copies of the relevant MSDSs. Each material has a unique 13 digit North Atlantic Treaty Organisation (NATO) Stock Number (NSN) that identifies the type of material (e.g. paint) and its country of origin. The system is searchable on this number or by chemical name or type. Examples of MSDSs were given to IEH. These included a manufacturer's MSDS with attached HSIS entry form; a screen dump from the on-line HSIS system and a printout from the most recent CD-ROM version of HSIS (the item's NSN is 8010992248906). Once a Unit has requested HSIS, it automatically receives updated versions of the CD-ROM. Small Units with only limited stocks of hazardous materials are given hard copies of the MSDSs they require.

Dangerous goods transport

The transport of dangerous material in the armed forces generally adheres to civilian regulations with occasional exceptions, either more stringent or more relaxed. For instance, while in civilian transport a driver must be over 21 years old to drive a vehicle carrying explosives, this age restriction does not apply in the forces. Rail transport of goods adheres completely to civilian regulations. New changes to regulation, including the enforcement of a European Union (EU) directive to replace UK-only legislation will involve some changes to the transport of dangerous goods in the forces.

Other systems

OLIVER, or Store System 3, is a system that records where stores are held, in what quantity and what supplies are on order or are due. OLIVER is used only at base areas (Donnington, Bicester, Portsmouth, Stafford) for the bulk storage of supplies. OLIVER automatically tracks past use of supplies, forecasts future usage and sets up the next order; there is a manual check/over-ride to ensure the system operates smoothly.

STAR has been in operation since August 1992 and provides a record of which Units receive which items. It is operated by Supply Chain Operation Control (Army) at Caversfield near Bicester. A contact name and address was given to IEH. Units are identified according to their Unity Identity Number (UIN). Information in STAR is fed in from OLIVER.

VITAL is a system for recording transport documentation. This is kept for three months before being transferred to STAR. The three month period is a statutory requirement.

Defence Supply Management System (DSMS) is scheduled to be operational in approximately four years and will be a tri-Service (and contractors) system that will follow the supply of goods from procurement through use to disposal. The aim is to reduce the need for stockpiles of bulk stores at base areas to a system whereby items are redistributed as needed from Unit to Unit. All Units will have access to DSMS.

Army Base Repair Organisation

An Army Base Repair Organisation (ABRO) staff member was introduced to IEH and gave his opinion on the use of MSDSs. He tended to find MSDSs were not necessarily helpful. For instance, they often lack information on the symptoms associated with exposure to a substance or do not give sufficient information regarding compatibility with other substances.

For health and safety more generally, ABRO considers itself to operate a generally good quality health and safety system.

Acquisition management system

During discussions, IEH queried how safety issues were incorporated into the procurement/supply of equipment/substances. A DLO Support Operations 5a staff member supplied copies of JSP 454

Procedures for Land Systems Equipment Safety Assurance and Acquisition Management System: Additional Information Ensuring Equipment Safety. The latter document is provided to Integrated Project Team (ITP) staff in addressing project/equipment/system safety issues.

Documents provided

- Copy of output from HSIS CD-ROM
- Copy of MSDS submission from supplier
- Copy of output from HSIS on-line system
- Ministry of Defence. Defence Contracts 68 (Edn 9/97) *Supply of Hazardous Articles and Substances*
- Ministry of Defence. Defence Contract Temporary Memorandum 4/98, January 1998. *DEFCON 68 — Control of Dangerous Articles and Substances*
- Ministry of Defence. Appendix to Defence Contracts 68 (Edn 9/97) *Supply of Hazardous Articles and Substances*
- Ministry of Defence. Army Code No 62030 (Pam 1) January 2000. *Materiel Regulations for the Army. Volume 9. Hazardous Material. Pamphlet No 1. Classification and Provision of Safety Data Sheets*
- Ministry of Defence. JSP 454. *Procedure for Land Systems Equipment Safety Assurance.* Issue 2, January 2000
- *AMS Additional Information Ensuring Equipment Safety.* Version 3, 11 August 1999

Further information available from:

DLO Andover
ES(Land) Sp Ops 4a(2)a
Building 300/2
Monxton Road
Andover
Hampshire
SP11 8HT

2.4.4 Environmental Monitoring Team, Keogh Barracks

Date of Visit: 15 June 2000

Introduction

This was the third visit made by IEH to Keogh Barracks (see also visits of 24 June 1999, Section 2.3.2, and 19 May 2000, Section 2.1.3). The purpose of this visit was to gather further information on the work of the Environmental Monitoring Team (EMT). A copy of this report was forwarded to the team member for his comment and amendment; no reply has been received.

The EMT tends not to have a proactive role; it is the role of DERA/manufacturers to assess environmental health issues relating to new equipment/processes. However, EMT have been involved in some preliminary assessment work such as assessing the noise footprint of a helicopter because the manufacturer had not been contractually obliged to do the assessment. The EMT is available as both an advisory service and as an analytical resource. Its workload is very variable, being particularly quiet during the summer and Christmas periods.

Units have various levels of personnel responsible for health and safety.

The Unit Health Advisor's role is to 'predict' health matters. They undergo a one week training course and are taught what to look for and where to look for it in terms of health and safety, for example food hygiene, waste disposal.

The Unit Environmental Health Duty Man attends a two week course and is taught about the cause and spread of disease. The focus is on prevention and control using simple measures, sanitation in the field and an understanding of pest entomology, pest control and water purification. A copy of the course content for these individuals was given to IEH.

In barracks, the local CO has ultimate responsibility for health and safety (see also report for previous visit to Army Medical Directorate (AMD), 19 May 2000, Section 2.1.3).

The Environmental Monitoring Team

The EMT takes its directions from AMD; reports by EMT go out on behalf of AMD, whether as part of a routine inspection or on an *ad hoc* basis. Units do not have the capability to do the work done by EMT. For instance, if a Unit has a thermal comfort issue, it will call on EMT to assess the problem but the EMT tends not to lend equipment to Units for them to perform work themselves. If the EMT is occupied on another task or cannot meet a Unit's deadline, the Unit may buy or hire the equipment or employ a consultant to do the work. The EMT is a sought after resource within AMD and if needed prior to a deployment, the EMT cannot take on any domestic tasks. For instance, the Kosovo deployment effectively tied the team up for five months.

There is no defined policy on the archiving of data or reports. However, the staff contacted have taken it upon themselves to maintain a record of data and reports. The EMT does not produce large numbers of reports. Paper copies of the reports are kept at EMT. An example report (noise survey, ABRO Bovington, March 2000) was given to IEH. These reports are written by EMT but are sent, after comment, by superior staff (copy of covering letter for Defence Animal Centre (DAC) Melton Mowbray, May 2000).

Environmental Monitoring Team instrumentation

A brief overview was given of the instruments available to EMT for analysing samples either sent to EMT by Units or taken by EMT during investigations. In the past, EMT analytical services focused purely on metals, with organic analyses being sent elsewhere. The EMT now has a wide range of instruments available. For analysing metals, EMT has an atomic absorption spectrometer and emission

spectrometer. Most analyses of metals involve lead (e.g. in firing ranges), chromium (hexavalent) and cadmium (e.g. electrical workshops).

For organic compound analysis the team has available an ultraviolet visual spectrometer, a gas chromatography mass spectrometer and infrared spectrometer.

Previously, staff also analysed asbestos samples but such samples are now sent to commercial laboratories.

Standard gravimetric instruments are also available (e.g. for particulates in air analyses).

When EMT receives a query from a Unit, the sampling equipment needed for the task is sent to the Unit Environmental Health Technician (if EMT is to do the analysis itself) or goes with EMT to the Unit. Records (paper) are kept of which equipment is sent where and to whom. A series of pro formas are used to record the origin of the sample (copies given to IEH). Reports based on analyses performed at EMT are usually written by the EMT or local team doing the sampling. Occasionally, one of the staff members contacted will write the report. Local team reports tend not to make their way back to the EMT as there is no defined policy on report distribution. Any recommendations or suggestions made in an EMT report are advisory only. Furthermore, budgetary considerations are often the main driver deciding whether or not a given recommendation is acted on or not.

It is hoped that the laboratory side of EMT will gain National Accreditation for Measurement And Sampling, but in view of the cost and the fact that the team is soon to be appointed a new Captain, this is not an imminent change. A review of the EMT and laboratory is currently being prepared for the new Captain, who arrives in late September or early October.

Documents provided

- Army Medical Directorate, Environmental Monitoring Team. *Noise Survey — DAC Melton Mowbray* (Ref: D/AMD/EMT/5674; 8 March 2000) and covering letter (Ref: D/AMD/EMT/5674 May 2000).
- Army Medical Directorate, Environmental Monitoring Team. *Laboratory Service Request Form*.

Further information available from:

Environmental Monitoring Team
Army Medical Directorate
Keogh Barracks
Ash Vale
Aldershot
Hampshire
GU12 5RR

2.4.5 Environmental Health Team, Imphal Barracks

Date of Visit: **27 June 2000**

Introduction

This visit was organised through AMD Ash Vale. Environmental Health Team (EHT) staff were met in York (Imphal Barracks) before going to Dishforth. The purpose of the EHT's visit to Dishforth was a Specialist Staff Inspection (SSI). A questionnaire is sent to the Unit being audited a few weeks before the EHT is due to arrive. The questionnaire should be completed by the 'competent person' at the Unit level. Usually this is the Unit Safety Adviser (USA); the competent person need not be a senior rank. Having received the completed questionnaire, the EHT visits the Unit and reviews any areas that have been raised in the questionnaire as being potential problems. The SSI involves a review of paper-based information the Unit holds such as the Unit safety policy (as set out by the CO), COSHH assessments and incident reports. When reviewing the local safety policy, it was recommended that the policy be set according to MOD/JSP (Joint Service Publication) rather than to specific civilian regulations. This is not to say civilian regulations do not apply, but is rather a way to ensure the policy remains valid when there are changes to civilian regulations. For instance, stipulating a given COSHH regulation in the policy will mean the policy is outdated as soon as a revised COSHH regulation comes into force. By saying the policy relates to MOD/JSP, it can remain unchanged.

Site walkover

A site walkover was conducted, which involved inspecting a number of hangars, workshops (road vehicles and helicopters), stores and the medical centre. At the same time, other EHT staff inspected the messes and kitchens.

A check was made of first aid kits in most locations, with the finding that many of them contained out-of-date eyewash. Although eyewash is often included in first aid kits, it was recommended that, where a potable water supply is available, bottled eyewash may not be necessary; most locations had a nearby potable supply. Furthermore, each kit should be tailored to the area it supports with, for instance, larger dressings in vehicle workshops where gashes or crush injuries could occur and plasters and smaller dressings in offices. Each kit should therefore have a specific contents list.

During inspection of a vehicle workshop, more general health and safety issues were highlighted such as fall hazards around a maintenance pit and ensuring Personal Protective Equipment (PPE) is available, clean and used. COSHH assessments were held in paper form in the area to which they applied (e.g. vehicle workshop). It was stressed that such assessments should also be held at a central location by the USA.

During discussions it became clear that USAs often see the SSI as an opportunity to raise concerns in order to ensure they are reported to the Unit CO in the audit team's report. Health and safety is the ultimate responsibility of the CO, but may not be the highest priority.

There is a lack of continuity in the manning of posts. For instance, specified individuals in work groups are responsible for the health and safety of their team. For instance, they will make weekly inspections of work areas checking for cleanliness and safety issues such as broken equipment or bare wires. However, when that individual is redeployed or goes on an operation or training exercise, there is seldom a hand over to the next person whose responsibilities they assume. In this way, systems and procedures may be lost in the hand over and will have to be re-established. Also, if a part of a Unit is deployed, a skeleton staff remains at the Unit. The health and safety systems for the whole Unit are too complex and time consuming for the smaller contingent.

Documents provided

- Environmental Health Team, HQ 2nd Division. Specialist Staff Inspection: 5 Regt RLC, Med/EH/19/3023/2. 27 January 2000
- Environmental Health Team. Specialist Staff Inspection: Medical and Environmental Health Unit (blank copy of audit form)

Further information available from: Environmental Health Team
HQ 2nd Division
Imphal Barracks
York

2.4.6 Occupational Health Centre, HM Naval Base Portsmouth

Date of Visit: 19 April 2000

Introduction

The aim of this visit was to understand the exposure measurements and records made and kept by the Occupational Health Centre. The ensuing visit report was returned to the Occupational Health Centre and the comments received taken into account.

IEH met one of three Occupational Hygienists covering mainly shore naval establishments in the UK. She covers the eastern side of the country, as far north as the River Humber. Her counterparts cover the western side of the country and north of the Humber, respectively. The Occupational Hygienists generally carry out investigations as requested and train and advise on the COSHH regulations.

An Occupational Health Nursing Advisor who is involved in health surveillance and training people to carry out risk assessments was also interviewed. She also spends one day per month at HMS Collingwood, providing occupational health advice.

An Occupational Health Nurse who, among other tasks, deals with the medical records held at the Occupational Health Centre was contacted. There is also an Environmental Protection Advisor based at the centre who mainly advises on spills as well as dealing with regulated emissions to air and water (e.g. emissions from spray and plating shops).

Occupational hygiene reports

Exposure monitoring tends to be carried out on a reactive basis, to investigate concerns about exposure or as part of a COSHH assessment. Most of the monitoring carried out is at shore-based establishments. However, some monitoring may be carried out on-ships, as and when requested (although most on-ship monitoring is carried out by INM).

Reactive exposure monitoring is written up as either a main report or letter report. Main reports are written in a standard scientific format (i.e. Background, Observations, Occupational Hygiene Standards, Measurements Made, Method, Results, Discussion, Conclusion and Recommendations). These reports include details of the location of monitoring (including building diagrams) and details of building ventilation. When personal exposure monitoring has taken place, the report also gives the names of those monitored (but not Service Number), describes their work and provide details of any PPE used (including the PPE stock numbers). Letter reports are similar to main reports; they are used when monitoring only involves a very few measurements, does not warrant being written up as a fully report, and so is reported in the context of a letter.

Once complete, the report is sent to the line manager for the area concerned and a progress report is required within three months to ensure recommendations are implemented. Copies of reports from the Naval Base are copied to the Chief Naval Base Safety Officer. If the monitoring has taken place on a ship, a copy of the report is also sent to the Fleet Health Office or the Flag Office Surface Flotilla (FOSF) Health, Safety and Environment Team, as appropriate. Copies of all full reports are sent to INM.

Copies of all reports (since 1980) are also retained by the Occupational Health Centre. The main copy is held in the departmental files and is filed according to file reference, which normally relates to the building (if in a Naval Base), establishment or ship in which the monitoring took place. A second copy is held in the Occupational Hygiene section and is filed with other occupational hygiene letters in date order. A duplicate copy of most full reports is also held in the Section, in order of report number. Exposure monitoring is also recorded on Field Survey Sheets, which are tables listing the location, hazard, whether pumps were used or a direct reading was taken, the date of monitoring and the reference number of the main report. Work has begun on a database (using a program called Cardbox),

which will include all the main reports. This is currently incomplete, but for each report will detail the report number, hazard monitored, date of monitoring, location of monitoring and whether the results were above or below the exposure limit.

Occasionally routine monitoring may occur. However, this is usually only when there is thought to be a continuing exposure problem. When routine monitoring is performed an MOD Form 933E, *COSHH — Routine Exposure Monitoring* (provided), is completed and sent to the line manager concerned.

COSHH assessments

COSHH assessments are usually carried out by the line manager and only when an assessment is complex would the Occupational Health Centre be involved. Assessments are made on MOD Form 911, *COSHH Assessment* (provided), and are retained locally. In HM Naval Base* Portsmouth copies of the assessment are also sent to the Safety Section, where they are logged and reviewed annually (they are entered into a database which automatically indicates when the assessment needs reviewing). In Naval Establishments a list of assessments is sent to the Safety Section and is reviewed every two years (unless there is reason to do so sooner).

Each assessment is made for a specific process and/or substance, and is not linked directly to those carrying out the process or handling the substance. However, the line manager will have a list of those working for him, and should be able to identify those currently exposed. In the future this may change, since a new COSHH assessment form (eight pages long) is being produced, by the Naval Base Supply Agency, which may record the names of those exposed.

Exposure to some substances requires health surveillance under COSHH, and in such circumstances an MOD Form 933F, *COSHH Regulations — Personal Exposure and Health Surveillance* (provided), will be completed and included in the individual's medical records. This not only indicates to what each person is exposed, but also records the generic outcome (e.g. fit for work) of the health surveillance.

Retention of COSHH assessments (MOD Form 911) is thought to be variable, and down to local practices. Assessments are probably only retained until a new assessment is made, after which the old assessment will be destroyed. Previous assessments, however, may be kept where the assessment is complex or control measures have been necessary, in order to demonstrate compliance. Being part of an individual's medical records, MOD Forms 933F, will be retained indefinitely.

Other sources of information on exposure to hazardous substances may include the Asbestos Notation forms (MOD Forms 960, 961 and 962). These are self-completion forms and are used if an individual suspects they have been exposed to asbestos. A copy of the form is placed in the individual's personnel file and medical records, although they do not trigger any health surveillance.

Risk assessments

Risk assessments on shore are carried out at a departmental level for a variety of risks such as manual handling, display screen equipment (DSE) (MOD Form 1054), confined spaces, and more generic risks such as for an office or workshop (various risk assessment forms provided). These assessments are usually made for the hazard, rather than naming those exposed, particularly since it can be difficult keeping them up to date, as service personnel tend to move from one job to another frequently.

* The difference between a Naval Base and Naval Establishment: Naval Bases provide direct support (e.g. marine engineering) to RN vessels (a large part of the Naval Bases used to be dockyards) whereas the Naval shore establishments provide other support to the RN (e.g. training, accommodation). The Naval Bases are part of the Defence Logistics Organisation, whereas most of the shore establishments in this area are part of Second Sea Lord/Commander in Chief Naval Home Command organisation.

However, where necessary the findings of the assessment are transposed to the training course level, and in some circumstances to fleet health level.

The checking of risk assessments by Safety Officers is variable: some require copies of each assessment to be sent to them, others only request a list of the assessments, while others carry out periodic sampling of risk assessments. The retention of risk assessments is also variable; however, it is common practice that when a new assessment is made any existing assessment will be destroyed. Exceptions are likely to occur when an assessment is complex or problems have occurred, in which case the previous assessments are likely to be retained.

Risk assessments for ships are made centrally and a ring binder of assessments provided to each ship (ship's personnel do not have to make the assessments). However, this system may have changed.

Noise assessment records

Noise assessments are made at the request of Line Management or as part of the required periodic reviews. Once complete copies of the form are sent to the Line Manager who requested the assessment, the Occupational Health Centre and INM. If the noise levels are above certain action levels, those working in the affected areas are given audiograms every two years, although this might be more frequent if hearing deterioration is detected. Copies of audiograms are kept in an individual's medical records.

Medical records

Only civilian medical records are held at the Occupational Health Centre. The exception to this is internal information copies of health surveillance carried out on behalf of the Principal Medical Officer, HMS Nelson, on service personnel working in Captain Fleet Maintenance (Portsmouth). A good example of medical record keeping may be found at HMS Nelson (contact Principal Medical Officer or Senior Administrative Officer).

Documents provided

- MOD Form 911 *COSHH Assessment*
- MOD Form 933E *COSHH - Routine Exposure Monitoring*
- MOD Form 933F *Control of Substance Hazardous to Health (COSHH) Regulations — Personal Exposure and Health Surveillance Record*
- MOD Form 945 *Noise Assessment Record*
- MOD Form 1054 *Display Screen Equipment Work Station — Assessment Checklist*
Manual Handling of Loads — Example of an Assessment
Risk Assessment Form (form JSP 375)
Risk Assessment Form (form BR9147)
Asbestos — Personal Record Annotation

Potential sources of further information

- Fleet Health Office, South Terrace

- FOSF Health, Safety and Environment Team: work in a similar capacity to civilian EHOs and carry out inspections of ships
- DRPS, located at INM — records of exposure to ionising radiation
- Principal Medical Officer, HMS Nelson — contact for medical records of service personnel
- Royal Fleet Auxiliary Principal Medical Advisor
- JSP 375 MOD Health and Safety Handbook
- BR2002 Ships Engineering Practices

Further information available from:

Portsmouth Naval Base
Health, Safety and Environment Group
Occupational Health Centre
Military Road (PP18A)
HMS Nelson
HM Naval Base
Portsmouth
Hants PO1 3ND

2.4.7 Institute of Naval Medicine

Date of Visit: **21 June 2000**

Introduction

The Institute of Naval Medicine is based in Gosport and aims to improve the operational capability of the RN by promoting good health and safety and maximising the effectiveness of personnel. The Institute is divided into six main divisions, these being the Environmental Medicine Unit, Undersea Medicine Division, Health and Hygiene Division, Statistics and Library Division, Medical Administration Division and the Training Division. The visit commenced with introductory presentations, followed by meetings with four of the individual divisions listed above. A report was produced on the visit, which was sent back to INM and the comments received incorporated in the final version.

Health and Hygiene Division

The Health and Hygiene Division is grouped into three areas: Occupational Hygiene, the Health and Hygiene Laboratory (which encompasses Submarine Environmental Chemistry), and Acoustics and Vibration.

Occupational Hygiene

Occupational Hygiene has a variety of tasks including toxicological assessment of materials for use in submarines, setting of submarine exposure limits (known as Maximum Permissible Concentrations (MPCs)), carrying out of workplace exposure monitoring and providing specialist assistance with COSHH assessments.

The toxicological assessments of materials for use in submarines are desk based and use literature searches and information provided by the supplier or manufacturer (if a manufacturer chooses not to supply the required information then the material is not allowed to be used on submarines). Each material is given a classification as to whether it is suitable for submarine use and all assessed materials are recorded in BR1326A. A file on each material is retained at INM including information on how it is to be used. In addition to the toxicological assessment, DERA performs fire testing on each material to ensure it is safe in the event of a fire.

Occupational Hygiene also carries out workplace monitoring of exposures to various substances. The INM is usually tasked to carry out the monitoring when a problem may be RN wide or is a problem which has been passed on from HQ. Reports of each monitoring exercise are made and copies sent to whoever has requested the report, the Defence Research Information Centre (DRIC) and the INM library*. Hard copies of reports are also stored within the Division by file number and date, and a database of the reports is currently being set up.

Health and Hygiene Laboratory

The Health and Hygiene Laboratory carries out a range of exposure monitoring analyses in the areas of:

- trace metals;
- organic solvents;

*The INM library maintains a database of all INM reports made and includes the department number, report title, authors and date. The database can be searched by any field and using any word in the title.

- water analyses; and
- other monitoring.

Trace metal exposure data

The laboratory carries out biological analyses for a range of trace metal exposures. In particular, it holds a large amount of data on biological monitoring of thallium exposures. Thallium is used in the Sting Ray Advanced Lightweight Torpedo and biological monitoring has been carried out on everyone who has worked on the programme since 1977. The majority of analyses relate to civilian personnel, but they include some RN personnel. Thallium exposures usually occur for short periods of about 10 days and are monitored pre-, during and post-exposure. All results are referenced to creatinine concentrations.

For all records names are held together with the workplace where exposure occurred. For service personnel Service Number is usually included, but not Unit as the great majority of persons exposed are civilians. The only servicemen tested are those attached to the British Underwater Testing and Evaluation Centre or a specific trials team. Civilian staff numbers are held, but the data are not complete. In all cases the Staff/Service Number is recorded in the database and can be used for searches.

Biological monitoring also occurs for lead and is monitored for a range of exposure types for civilians, RN, Royal Marines (RMs) and some Army personnel (mainly Special Air Service). Short-term inorganic lead exposures are monitored by using blood lead levels, such as for those exposed at firing ranges (e.g. weapons training instructors and range cleaners), or from cutting lead-painted steel etc. Zinc protoporphyrin analysis is used as a marker of chronic exposure and urine lead analysis is carried out as surveillance for organo-lead exposures, usually in people cleaning tanks that have contained leaded petrol. Results of lead biomonitoring are held as hard copy reports, which are also available on computer and date back 20 years. The results cover a range of civilians and service personnel, and should be added to each individual's medical records. Results for the past three to four years are also held on a computer database. Results pertaining to Special Forces are anonymous or give Service Numbers only.

The laboratory also carries out some other trace metal biomonitoring for chrome nickel (routine analysis of urine samples collected quarterly, but for civilians only), cadmium (mainly blood and urine analysis of civilians involved in plating and handling of materials) and a few mercury exposures. It is the intention to offer twice yearly urine monitoring of mercury exposures to all RN dentists and dental technicians in the future. However, to date this has only been carried out on an as requested basis or as a result of an incident. Reports on these biomonitoring data are held as hard copies and computerised reports.

Other monitoring of metal exposures is carried out by Naval Base Occupational Hygienists who send filter samples from air monitoring to INM for analysis. Only the analytical information for these analyses is retained at INM; however, they probably mainly relate to civilian personnel with only a few samples being ship based.

Organic solvents

The Health and Hygiene laboratory carries out some analysis of organic solvent exposures in the workplace. These are, however, very variable in nature and are normally controlled by appropriate occupational hygiene procedures.

Water analysis

The Health and Hygiene Laboratory also carries out routine monitoring of drinking water samples from ships for chemical and bacteriological quality. Ideally samples should be collected quarterly for bacteriological analysis, yearly for chemical analysis and following a refit or incident. However, this

is subject to assistance from the fleet, and although routine water analysis is required on all ships and submarines, in reality samples are not routinely taken to any extent on submarines, and hence most samples are from surface ships. Bacteriological analysis of the water is compared with limits set in BR820; chemical analysis covers over 90 inorganic and organic parameters, and is compared with limits set in the drinking water regulations.

All data from water analyses are held on a database, which currently includes information relating to bacteriology and inorganic chemistry, with organic chemistry to follow. This holds about four years data. Copies of reports prior to this are held electronically, and prior to 1993 data are in hard copy. Records before this are somewhat sporadic. Any data generated by third party laboratories are included on the database although this is usually limited in scope.

Other monitoring

Other areas of monitoring may include some environmental monitoring, where people may have been incidentally exposed, and some food bacteriological monitoring. The laboratory also provides an asbestos identification service, but actual asbestos fibre counting is contracted out to external providers.

Other sources of exposure data may include the Land Quality Assessment Team and the DERA Porton Down Environmental Group, which has done some work on chemical weapon exposures.

Submarine Environmental Chemistry

Submarine Environmental Chemistry is involved in co-ordinating an active retrospective sampling of submarine atmospheres. This is carried out using Tenax tubes, and is in addition to the on-board continuous monitoring of permanent gases (see Statistics and Library Division). Sampling is carried out, by Medical Personnel trained by INM, in accordance with BR1326 every time a submarine has been dived for more than three days. The tubes are exposed actively using a hand-held bellows pump, and a 200 ml sample is taken over a period of about 2 minutes. Although, in occupational hygiene terms, this method may seem rather primitive, it is believed that the contaminants in the air inside submarines are much more evenly dispersed than contaminants would be in an occupational environment. This is due to the air purification and distribution systems within the submarine.

The Tenax tubes are returned to INM and are analysed by gas chromatography/mass spectroscopy for a range of organic compounds. The compounds of particular interest are identified as a result of the toxicological assessments of materials made by the occupational hygiene group. However, the range of substances of interest is ever changing and evolving and also includes compounds that indicate the effectiveness of the air purification. The results are compared with Maximum Permissible Concentrations (MPCs), which are exposure limits for anything between 24 hours and 90 days. Currently there are only a limited number of organics for which MPCs have been set and these mainly relate to benzene, ethyl benzene, toluene and xylene. However, the setting of MPCs is an active process and limits for other compounds are currently being set. Reporting of the analyses details what has been analysed for, the results, and also everything else that was detected on the tubes. Hard copies of reports date back 30 years and are kept indefinitely at INM (filed by submarine and date) and at DRIC.

Acoustics and Vibration

Acoustics and Vibration offers advice to the MOD on all aspects of noise and vibration issues. It often acts on a consultancy basis making noise and vibration assessments, comparing them with the relevant standards and making recommendations as to control or duration of exposures. Recommendations are not followed up though because the client is not in the same organisation as INM and hence INM has no authority to insist recommendations are implemented (cf. Occupational Hygienists at Naval Bases who are part of the Naval Base). Examples of assessments made include vehicles, hand-held tools, weapons and whole ships. Reports are written on all surveys and hard copies sent to whoever requested the report, DRIC and the INM library.

Acoustics and Vibration also runs noise assessment courses to train people to be competent noise assessors in order to be able to complete MOD Form 945 (Noise Assessment Record) and assess noise with respect to the guidelines. Completed forms are retained by line managers in the ship/establishment, and a copy is meant to be sent to INM. However, not many forms are received and it is not clear whether this is because not many assessments are made or that assessors do not comply in sending forms to INM. Received forms are checked to make sure the assessments have been carried out correctly, and are stored by the date received. The intention is to put all reports and Noise Assessment Records on a database at some time in the future.

Medical Administration Division

Medical records for all Naval personnel who leave the Service are received by the Medical Administration Division and are stored at INM for a period of two years, during which time the Division handles all requests for information (e.g. from GPs or building societies etc.). In order to check all the relevant medical records have been received, the Division receives monthly lists of personnel who have left the Service, against which it checks that the records have been received. If not, attempts are made to obtain them from the relevant source and are continued for about a year, after which they cease, since records cannot be chased forever.

After two years the records are packaged up in Hayes numbered boxes (only since 1996, pre-1996 records are just stored in boxes by year of release) and are sent to Hayes for storage. A paper record of where medical records are located is retained indicating name of service personnel, year of departure and box number. The Division also maintains a database of records received detailing the records received, year of release, release establishment, name and Service Number. There was an intention to scan all medical records on to computer files; however, this has since proved to be impractical due to the time involved in scanning the records.

Undersea Medicine Division

Several diving records are made for every dive made by service personnel and include the Unit diving log, the individual's diving log and the Record of Dives form, which is completed by the dive supervisor. The Record of Dives form has been used since 1994/95 and is forwarded to the Statistics Division at INM and stored on a computer database (see Statistics and Library Division).

The Undersea Medicine Division maintains several databases, including a military diving accident database detailing accidents where the diver was involved in the accident, rather than the accident being a result of equipment failure. This database can be queried to look at rates of occurrence for different types of problems with different types of dives. It is linked by a reference number to the Unit's master diving log and vice versa. The Division also keeps a fit-to-dive database, which is a simple one-sheet FoxPro system for typing up reports, and maintaining fit-to-dive records.

Statistics and Library Division

The Statistics Division receives and analyses routine records of Submarine Atmosphere Control Logs and Record of Dives forms.

Atmosphere control logs are completed by engineers on a submarine every four hours and record the permanent gases that are continuously monitored on a submarine (see Atmosphere Control Log Form). Completed forms are sent to INM and the hard copy forms are stored according to submarine and date. All forms for nuclear submarines have been put on computer files since 1989, with the data entered being that relating to Routine Atmosphere Readings and Atmosphere Equipment Log data (see Atmosphere Control Log Form). The data are stored in a text format, making it easy to transfer to other formats, and easy to query by writing an appropriate program. The Undersea Medicine Division writes a critique of the Atmosphere Control Logs. Slightly different records are maintained for conventional submarines, and only in paper format. However, all submarines in the fleet are nuclear powered, and hence all atmosphere control data for them are retained on computer.

The Statistics Division also handles Record of Dives/Employment Forms. Since 1994/95 any dive made by the Services should have been recorded on a Record of Dives/Employment form and sent to INM. Records are entered on to computer in an ASCII fixed format layout and can be queried by any field using some simple programming. The production of a Record of Dives/Employment relies on the supervisor making the record and compliance is thought to be high in the RN, but lower in the Army. There are approximately 1500 divers in the RN and about 27 000 dives are recorded each year with about one in 500 dives resulting in an accident. The data collected are used to try and investigate patterns and causes of accidents. Other diving records include the individual's log of dives made, and a Unit's master log of dives made retained by the diver and Unit, respectively.

Other records of interest may include flying logs kept by RN pilots. The Central Air Medical Board also logs a pilot's flying hours as part of a regular medical to assess a pilot's fitness to fly. Such records may date back to the 1950s.

Note: Divers in the RN receive an extra pay allowance for being a diver. However, to maintain this allowance they have to do a minimum of about 90 min diving every four months. Submariners also receive an extra pay allowance, which is awarded once they complete their submarine training. They don't necessarily have to be regularly deployed on a submarine to maintain this pay and so, for example those training submariners are also on submariners' pay, but not routinely on a submarine. This could have important implications if trying to define cohorts based on job titles or training records.

Documents provided

- Submarine Atmosphere Control Log
- Record of Dives/Employment Form with Instructions for Use
- INM Departmental Telephone Directory

Potential sources of further information

- Defence Research Information Centre, Glasgow
- Principal Occupational Hygienist, Defence Procurement Agency, Abbeywood, Bristol, BS34 8JH

Further information available from: Institute of Naval Medicine
Alverstoke
Gosport
PO12 2DL

2.4.8 Flag Office Surface Flotilla Health, Safety and Environment Team, HM Naval Base Portsmouth

Date of Visit: 12 October 2000

Introduction

The purpose of this visit was to accompany the FOSF Health, Safety and Environment Team on a health and safety audit of HMS Gloucester, in order to gain a better understanding of exposures and health and safety on ships. This report was commented on by the FOSF Health, Safety and Environment Team and the comments incorporated in the final version of the visit report.

Health and safety audits of ships are carried out once every two years. The aim of the safety management audit is not only to check compliance with procedures, but also allow opportunities for health and safety concerns to be raised and discussed with the auditors. The audit of HMS Gloucester mainly consisted of checks of records combined with checks on specific areas of the ship. The auditing team also carries out advisory visits to ships to assist them in managing health and safety successfully at sea.

Organisation of health and safety on ships

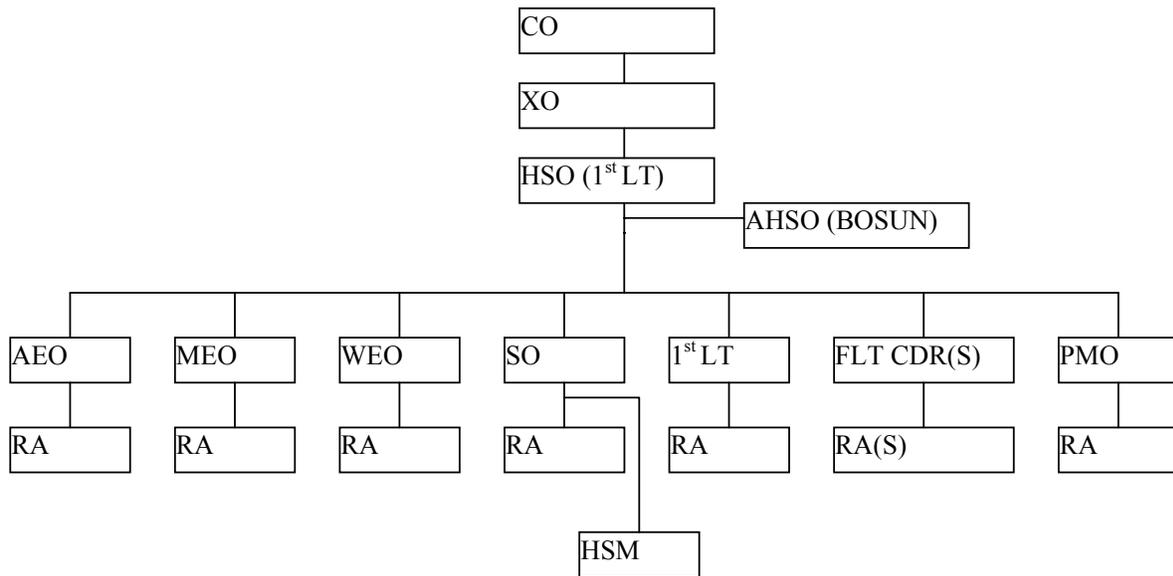
Health and safety on ships is the responsibility of the Executive Officer, who is second in command to the CO. His responsibilities are discharged via the Heads of Department, who are supported by a trained Risk Assessor (Figures 4 and 5) within each department. Additionally, the Hazardous Stores Manager is responsible for the issue and stowage bulk of hazardous substances.

Communication of health and safety matters occurs at a number of levels. Each ship holds Ships General Orders, which are produced by FOSF and apply to all ships in the Surface Flotilla. Additionally, each ship has Captain's Standing Orders, which are produced by the Captain and are specific to the ship under his command. Both of these sets of orders will contain some aspects relevant to health and safety. Additionally, health and safety matters may be communicated by Surface Flotilla Temporary Memorandums, RN Temporary Memorandums or Defence Council Instructions, depending on the scope of the matter. For example a temporary memorandum was recently issued to the Surface Flotilla concerning the storage of calcium hypochlorite granules (for water chlorination) following an incident when a fire pump leaked over the granules, resulting in the production of chlorine gas.

Health and Safety Log

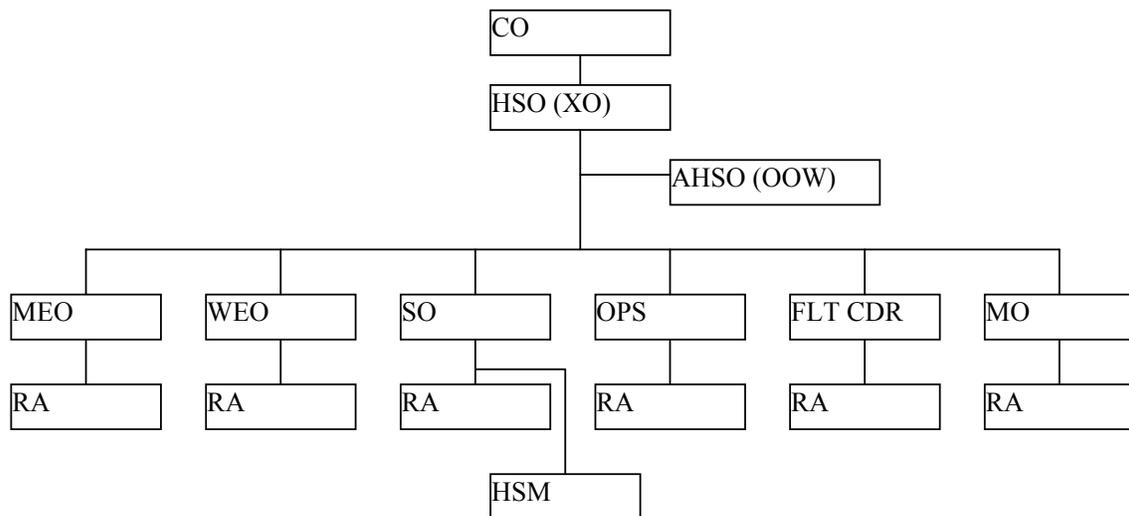
The Health and Safety Log is issued for the guidance of ships of the Surface Flotilla and should be read in conjunction with other Orders. All members of the Safety Committee are to read the Log on joining and every six months thereafter; Heads of Departments are to read the Log on joining and annually thereafter. Readers should record that they have done so, on the Health and Safety Log signature page at Section 1. The Log should be kept readily available for consultation and used by all supervisors and members of the Safety Committee. Its normal whereabouts should be published on the Health and Safety notice board. The Log should be managed by the Assistant Health and Safety Officer (Health and Safety Officer in Destroyers and Frigates) and should be submitted to the Executive Officer (CO for Destroyers and Frigates) for examination as a quarterly book. The Health and Safety Log provides a focal point for Health and Safety information and instructions; it does not dispense with the need to comply with the Queen's Regulations for the RN and other such orders issued from the MOD. Health and safety is also a consideration in a ship's scheme of complement. Training requirements for each billet number are specified, and since 1990 they have included the health and safety training necessary for each billet number. A health and safety meeting is held on the ship every three months, the minutes of which are sent to the FOSF Health, Safety and Environment Team.

Figure 2.4 Ship's health and safety organisation (Invincible Class Aircraft Carrier, Fearless Class Amphibious Ship and Ocean Class Amphibious Troop Carrier)



AEO, Air Engineer Officer; AHSO Assistant Health and Safety Officer; CO, Commanding Officer; HSM, Hazardous Stores Manager; HSO, Health and Safety Officer; MEO, Marine Engineer Officer; PMO, Principle Medical Officer; RA, Risk Assessor; SO, Supply Officer; WEO, Warfare Engineer Officer; XO, Executive Officer

Figure 2.5 Ship's health and safety organisation (Destroyer and Frigate)



AHSO (OOW), Assistant Health and Safety Officer (Officer of the Watch); CO, Commanding Officer; FLT CDR, Flight Commander; HSM, Hazardous Stores Manager; HSO (XO), Health and Safety Officer (Executive Officer); MEO, Marine Engineer Officer; MO, Medical Officer; OPS, Operations; RA, Risk Assessor; SO, Supply Officer; WEO, Warfare Engineer Officer

Accident reporting

When an accident occurs it is reported and recorded in a standard accident book, and on MOD Form 2000, from which it is entered into the CHASP system. A copy of the MOD 2000 form is given to the personnel involved in the accident and a copy is also placed in their F Med 4. Each serious accident is

investigated, usually by an officer and senior rating, who produce a report, which is submitted to the CO, and a copy forwarded to FOSF. The ship retains its accident books for five years and investigation reports are kept at FOSF for six years. If it is thought likely that an accident may result in a claim for compensation, legal advice is sought and the documents retained. Although the accident is recorded on CHASP, it is usually of little use when investigating an accident retrospectively. FOSF has recently instructed ships to adopt a new procedure whereby other than serious accidents are investigated and documented using an Accident Investigation Report Form.

COSHH and hazardous stores

Until last year, each ship had its own system for maintaining COSHH records. However, this led to wide variability in systems and standards of safety, and hence a single system has now been implemented in all ships. Within each department on a ship there is a COSHH log of the hazardous substances in the department, including details of the name, NSN, risk, stowage and a reference for each substance's safe use. In addition to this, each section within a department holds a section COSHH log, which includes all that has been mentioned for the Department Log and MSDSs for the substances in use. The procedures for performing tasks using hazardous substances are laid down in Books of Reference (BRs), which include information on COSHH and detail the necessary PPE for the task. It is the responsibility of the line manager to ensure the procedures are followed. No records of usage of hazardous stores are made. However, records of stowage may be maintained and hazardous stores are not permitted on board a ship without an MSDS.

Noise

Noise assessment surveys have been carried out in all areas of all ships and detail the noise levels in each area of each ship and are recorded on MOD Form 945. These surveys are used to produce a list of Noise Hazardous Areas for each ship, which indicate the areas where noise levels exceed statutory limits and hence ear protection must be worn. The noise assessments and list of Noise Hazardous Areas are retained on the ship, and discarded when a new assessment and list are made. The noise assessment for HMS Gloucester was carried out in 1995 by the Naval Medical Office Health (NMOH) and was due to be updated in 1997, 1999 and completely re-done in June 2000. NMOH has recently informed all ships that their current MOD Form 945 remains in date.

In addition to the noise assessment, each ship has a noise monitor and a trained noise assessor, which is usually the Senior Medical Branch Rating (SMBR), on board. If there is a potential noise problem, the SMBR can make an initial assessment, and if the initial assessment indicates a problem, they can request a more detailed assessment by the NMOH.

Display screen equipment

Computer terminals have been installed in the ship, and DSE assessments have been carried out accordingly. However, terminals are installed in the space available, which is not always the best position ergonomically. The terminals are bolted to the surface both for stability and to protect the occupier of the compartment in times of conflict, which does not allow workstations to be adjusted to suit the operator. This can lead to musco-skeletal problems if, for example, a writer uses a poor workstation frequently. The ship maintains a list of its IT assets and the current DSE assessments which are listed in priority order and defects progressively corrected. The DSE assessments form part of the checks carried out by the FOSF Health, Safety and Environment Team during audits.

Safe systems of work and other health and safety issues

The ship maintains a General List of Hazardous Activities, which can include general tasks, maintenance tasks, operation of equipment, diving, exercises and recreation activities. All the activities are referenced to the appropriate BRs, which set out the procedure for carrying out the activity safely. Where a BR does not exist for a particular hazardous activity, a specific risk assessment is made. Only a list of common hazardous activities is maintained.

Where there is a significant risk from a hazardous activity, a permit to work (PTW) is required. This particularly relates to confined space entry (usually spaces without ventilation or not regularly entered), work involving hot tasks, for example welding, and working aloft, where individuals may be exposed to high frequency non-ionising radiation. PTWs have to be signed by an authorising officer or, for working aloft, permission sought from the Officer of the Day, and once the work is complete the permit is destroyed. Contractors and sub-contractors, however, are not always aware of the hazards on board ships and particularly when working aloft, and therefore require an in-depth brief to be given by the contracting authority before being cleared to work on HM Ships.

A similar system to the PTW system is operated for diving, in order to make sure that engines are not operated or underwater transmitters used while diving is in progress. Once the dive is complete, a Safe to Turn certificate is signed, allowing the engines to be operated.

Currently a system is in use that allows shortcomings in design or operation of a particular piece of equipment or product to be reported back to the design authority. The system uses the S2022 Form and may be used to highlight design faults, defects in equipment, a lack of supporting documents or the absence of MSDS, etc.

Naval Medical Office Health

The NMOH also carries out audits of ships and overlaps on some of the areas covered by the FOSF Health Safety and Environment Team. The remit of the NMOH is more environmental health based and includes noise surveys and audits of areas such as food hygiene, environmental health, hygiene, and asbestos. The NMOH also carries out some health surveillance through audiometry testing and dermatitis checks of engineering staff.

Potential sources of further information

- Naval Medical Office Health

Further information available from: Flag Office Surface Flotilla
Jago Road
PP73A
HM Naval Base Portsmouth
Hants
PO1 3LU

2.4.9 RAF Institute of Health*

Date of Visit: 15 May 2000

Introduction

The Institute of Health (IOH) has a number of groups that collect exposure data in the areas of occupational hygiene, noise and vibration and environmental health. IOH also collates information relating to the safe use of hazardous substances. The purpose of this visit was to gain an understanding of these systems. A visit report was produced and sent to IOH, and comments received were fully taken into account.

Dangerous Engineering Substances Advisory Team

The Dangerous Engineering Substances Advisory Team (DESAT) collects MSDSs for all hazardous substances used in the RAF and collates them into HSIS. DESAT is notified of a substance's use in one of three ways:

- the supplier sends them an MSDS, as a requirement of the supplier's Defence contract;
- an engineer sends an MSDS to DESAT in accordance with General Administration Instruction 5011; or
- an individual makes an *ad hoc* enquiry as to the safe use of a substance, thus alerting DESAT to its use.

Once an MSDS has been obtained, it is checked by both DESAT and, in the case of new substances, by an Occupational Physician and a front sheet for the substance is created in an on-line version of HSIS. The MSDS is then sent to ICL (with whom DESAT has a Private Finance Initiative (PFI)), which inputs the MSDS verbatim into HSIS. The entered MSDS undergoes a series of checks, both at ICL and IOH, to ensure the entered data are 100% accurate. This is important, since if the MSDS is altered the legal responsibility for the information would move from the supplier to DESAT. Where necessary, however, it is possible to add additional information to the data sheet without changing the MSDS itself. This is done by using sub-paragraphs for 'Additional MOD Information', which may include information helping the user interpret the MSDS, indicate a need for health surveillance or refer the user to a guidance note on the substance. Once complete, the data sheet is made part of the off-line database, which is produced and issued as a CD-ROM every three months.

The HSIS is widely used in the MOD, being distributed to several thousand customers, and enables the MOD to meet its statutory duty to provide health and safety information to its employees. HSIS is also often installed on laptops for those working in the field in both peace and operational situations, (e.g. Tactical Supplies Wing) since as well as health and safety information HSIS contains information on transport of hazardous substances for CHIP Regulation purposes. The CD-ROM database is fully searchable by a range of parameters such as NSN and commercial name; the on-line version is also searchable, but to a much greater extent, for example by date of issue etc. HSIS does not currently reflect all hazardous substances used in the MOD; however, it has the potential to do so in the future.

When an MSDS changes, the changes are updated in HSIS using the procedure outlined above to ensure 100% accuracy. The fact that an MSDS has been superseded is recorded on the on-line database and all superseded MSDSs are retained indefinitely by DESAT (stored by NSN), since they

* Shortly following the visit to RAF IOH, it moved to and became part of the RAF Centre of Aviation Medicine at RAF Henlow. The PHMD became Environmental Health Flight, and the Occupational Hygiene Division became Occupational Health Flight, and both now belong to Occupational and Environmental Medicine Wing

cannot dispose of information someone else may have been liable to in the past. It is therefore possible to know how a substance may have been used at a specific time in the past. This is often used when an Occupational Health consultant needs to provide advice on a pension claim.

DESAT also provides advice on the use of hazardous substances when necessary and is responsible for editing AP 100B-10: *Dangerous Engineering Substances*. The Army and RN have similar systems to DESAT; however, the whole operation is contracted out to PFI.

Occupational Hygiene Department

The Occupational Hygiene Department (OHD) carries out reactive monitoring according to taskings provided by Command. A typical occupational hygiene main report contains: Introduction, Standards, Toxicology, Methods, Analysis, Quality Control, Results, Discussion, Conclusions, and Recommendations. The report will also contain information on the location of sampling and the trade of any individuals monitored. However, it does not individually identify those monitored. The department has a spreadsheet of the reports it has produced, which lists the Location/Station, Visit Date, Personnel Tasked, any Remarks and the File Reference Number. The completed reports are stored by the Date and File Reference Number.

The OHD, along with EHOs and Technicians from the Public Health Medicine Division (PHMD), also provides support to Aircraft Recovery Officers, following air crashes. For example following a Harrier crash carbon fibre may be a hazard, and a crash investigator may require Category Three protection until occupational hygiene monitoring has been carried out to indicate otherwise.

Noise and Vibration Division

The Noise and Vibration Division works in a similar manner to the OHD, in that it carries out reactive monitoring according to taskings provided by Command. A typical report would contain the following sections: Introduction, Background, Measurement Method, Analysis, Results, Discussion, Conclusion, and Recommendations. The report also records the meteorological conditions at the time of sampling.

Public Health Medicine Division

Environmental Health Officers and Technicians from PHMD, OHD and at digital posts on other RAF Units can be utilised to provide environmental health reconnaissance on exercises and detachments. Tactical Medical Wing tasks the Command EHO at HQ Personnel Training Command and he in turn selects the most suitable person to attend the exercise or detachment. The EHOs/Technicians carry out reconnaissance on a variety of potential hazards including water supplies (the Royal Engineers actually provide the water), food supply, catering, sanitation, pest control and dust. They are also beginning to carry out Force Protection, which involves reconnaissance of disease vectors and industrial pollution as well. Travel briefs for detachments/deployments are produced by Permanent Joint HQ (PJHQ).

The reporting of the reconnaissance varies considerably and may be in the form of an IOH Post-Exercise Report, may be reported on locally or may simply be a contribution by the EHO/Technician to the Unit Commander's Exercise Report*. In the later circumstances it will be down to the individual whether they make a separate IOH report, and although there may be another report elsewhere, its location may not be readily known. The structure of a typical Post-Exercise Report usually contains the following sections: Introduction, Geography of the Area, Environmental Health Reconnaissance, General Information, Water Supplies, Food Supply, Catering, Sanitation (including, if appropriate,

*A report will be made on every exercise carried out since there is a need to learn from the experience. An exercise is usually classed as any operation away from an established base; however, it is possible to be detached and not on exercise.

sections on Deep Trench Latrines, Shower Facilities, Urinals, Soakage Pits, and Drainage), Pest Control, Dust, Conclusions, and Recommendations.

The PHMD maintains a database of all infectious diseases contracted by service personnel in the RAF, Army and the RN and also responds to outbreaks of infections such as food poisoning. PHMD also carries out assessments of all publicly funded catering facilities and Navy Army and Air Force Institutes (NAAFI) facilities in the RAF. Also, they undertake annual assessments of operating theatre ventilation systems in all military hospitals. The PHMD also has an Environmental Protection role, which mainly involves reactive provision of advice and monitoring of environmental incidents, for example a pipeline fracture and how to remediate the ensuing fuel spill. This will be reported on and the report held centrally at IOH.

Records at the RAF Institute of Health

All IOH reports produced by each division are stored in a central archive by the date of the report and file reference. There are two types of report: letter reports and main reports. Letter reports are usually used if there is little or nothing to report or the work carried out was small scale or a preliminary survey. Reports date back to 1975; however, those from the mid-1980s onwards are likely to be more reliable and of higher scientific quality. Some reports may be missing where individuals have borrowed and not returned them.

All the IOH reports are indexed on an Excel spreadsheet, which records the Year, Station, Location (on station), Subject, Report Number, Department (who produced the report) and a free text field describing briefly what was reported on. The spreadsheet can be searched by all the fields, although the Year and Station fields are likely to be of most use. The Subject field contains only one subject heading for each report, and hence may not always reflect the aspect of a report an inquirer is interested in. In the future it is hoped to be able to store all IOH reports on a CD-ROM or DVD, which may allow greater search capabilities of the reports. However, this idea is still only at a discussion stage, and it is unlikely that diagrams included in reports would also appear on the CD-ROM.

Documents provided

- DESAT Summary
- MOD Safety Data Sheet for AVGAS 100 LL, off-line CD-ROM Version
- MOD Safety Data Sheet for AVGAS 100 LL, on-line version
- Product Safety Data Sheet for AVGAS 100 LL

Potential sources of further information

- RAF Stanbridge — information technology base for Stores. Likely to be able to identify what is supplied where, when and in what quantity. The Product Managers for each substance should hold some of this information.
- Specialist in supply and transport of hazardous substances who might know where and how substances are used. Address is:

Log Sp Sucs 5B(2)
HQ QMG
Building 300
Monxton Road
Andover
Hants SP11 8HT

- Environmental Monitoring Team, Keogh Barracks, Ashvale.

- Tactical Medical Wing, RAF Lyneham — task IOH to deploy and probably produce reports themselves.

Further information available from:

Environmental Health Flight
Occupational and Environmental Medicine Wing
RAF Centre of Aviation Medicine
RAF Henlow
Bedfordshire
SG16 6DN

2.5 Historical records

2.5.1 Army Historical Branch

Date of Visit: 27 September 2000

Introduction

The purpose of the visit was to gather information on the Ministry of Defence (MODs) Army Historical Branch (HB(A)). A previous draft of this report was sent to the Branch and this version incorporates the amendments suggested.

Background

The HB(A) is essentially a 'corporate memory' for the Army. It provides advice to Government (MOD) and has easy access to material held both at the MOD archives in Hayes and to defence-related classes held at the Public Records Office (PRO). The HB(A) is neither an archive nor a library and does not hold a great deal of original information itself. Rather, it is a research branch called upon by other agents (e.g. MOD, the Services, other Government Departments and the War Pensions Agency (WPA)) to gather historical advice, information and analysis. The information the HB(A) does hold tends to be regulatory/policy related.

Army Historical Branch activities

The bulk of HB(A)'s work is for the MOD and the Armed Forces. Of its non-MOD enquiries, the HB(A) is most frequently called upon by the WPA to investigate pensions claims from ex-Army personnel. The HB(A) then approaches other agencies or branches such as the MOD archives, the Army Personnel Centre (APC), Royal Logistic Corps, Defence Estates or DERA Radiological Protection Service (DRPS) to gather the necessary material, which is then analysed and an answer provided. The process is almost wholly paper based although the experiences and knowledge of serving or ex-servicemen can also be useful.

War Pensions Agency-related work

Some examples were given of past activities in which the HB(A) has been involved, such as exposures to asbestos, paints, solvents, fuels and nuclear testing. For instance, claims for possible asbestos exposures have formed a large part of their work. The difficulty the HB(A) find is in defining where a person was at a given time. The HB(A) must therefore liaise with other agencies such as the APC or Hayes archives to establish whether the person was at a location at a specific time. While this is generally possible, it is more difficult to establish whether or not someone was actually employed or living in a specific building that contained asbestos or whether a building, site or establishment might have contained asbestos.

A person's location can usually be found by reference to their Record of Service (ROS), with information relating to specific Units with which the individual was serving. If the investigation relates to an accident, it may be possible to examine medical documentation, although HB(A) does not have routine access to such documentation. The WPA should have access to information in Service medical documentation through the branches that hold relevant ROS, deposited at the APC or Hayes. There are also standard MOD/Army accident report forms, but the absence of a form on the ROS does not prove that no accident happened. During operations the Commander's Diary (which is raised at Unit level and maintained there until being archived at Hayes) may give information on casualties or accidents. Non-operational reports, or Unit Historical Records (UHRs), should also be produced by Units (normally covering an April to March period), which can also be referred to for information. However, the quality of these records is variable. In most cases it is likely that the Diary or UHR will only detail major incidents and not provide background on minor incidents etc. The HB(A) also

employs regimental/corps gazettes and journals, which can be useful for colloquial information on accidents and other incidents. In general, the HB(A) approaches the relevant corps or regimental HQ before approaching individual Units. Also, there are various schools, such as the School of Signals, to which the HB(A) goes for information. The quality of record keeping is variable and some information that could be of use may have been routinely destroyed or weeded. For instance, knowing when a person was on leave may be useful for a given incident but that information may not be in their records because it was weeded. Therefore, the records cannot be wholly relied on to tell a 100% accurate story and it is seldom that it is possible to say for sure where someone was at a given time.

Policies and orders can also give information on the hazards or exposures that were of concern at a given time. For instance, individuals have claimed for hearing damage due to being too close to a 'thunderflash' detonation. On looking at policy/orders regarding the use of such ordnance, it was found that there had been repeated orders that the thunderflash should not be used in enclosed spaces or thrown within certain distances of individuals. Therefore, the policy was that it should not happen, but the repeated issue of such instructions made it clear that accidents were occurring and that it was an on-going problem. Similarly, whilst the policy/order may be that Personal Protective Equipment (PPE) worn for a task, this does not confirm that it was either available, used or its use enforced. It must also be borne in mind that the regulatory environment changes; what was once acceptable may become unacceptable due to new regulations or legislation.

Army Historical Branch information holdings

The HB(A) holds some information in-house, built up over time as a result of repeated queries on specific subjects. For example it holds some information on what materials will or will not contain asbestos and information on pesticides used in the Gulf. Regulatory information is also held as is instructional material (e.g. safety procedures, PPE). As outlined above, the HB(A) also has links with the archive at Hayes and the PRO.

Further information available from: Army Historical Branch
Ministry of Defence
3-5 Great Scotland Yard
London
SW1A 2HW

2.5.2 Naval Historical Branch

Date of Visit: **18 October 2000**

Introduction

The purpose of this visit was to learn about the records held by the Naval Historical Branch (NHB). Comments on this report were provided and have been taken into account.

In the context of this investigation, the NHB is responsible for maintaining records of all Royal Navy (RN) activities, particularly those involving operations involving Her Majesty's (HM) Ships and naval aircraft, for producing official reports and histories or specific operations, and for responding to questions, both official and from the public, on naval history. The NHB deals almost exclusively with operational affairs and holds no current personnel records. The main sources of information to enable the NHB to perform these roles are signals and correspondence, Reports of Proceedings (ROPs), and Ship's Logs.

Ship's Logs

The Ship's Log is maintained either on the bridge at sea or on the gangway in harbour. Each Log covers one month, with one day to each page. It is maintained either personally by the Officer of the Watch at sea, or by the Quartermaster under the supervision of the Officer of the Watch or Officer of the Day in harbour. The following information is routinely recorded in the Log:

- details of the ship's course and speed, engine revolutions and distance sailed, recorded hourly;
- details of the ship's position, recorded three times each day when out of sight of land, and more frequently when inshore;
- details of wind, weather, sea state, temperature and barometric pressure, recorded four hourly; and
- the damage control state of the ship and changes thereto.

A blank copy of a Ship's Log was provided. The first two above are, of course, applicable only when the ship is at sea.

In addition, events in the daily life of the ship are recorded in the Remarks section. These would include musters of the ship's company, letting go and weighing anchor, securing alongside and proceeding to sea, conducting replenishment at sea and, when on active operations, opening and ceasing fire, coming under enemy attack, damage suffered etc. However, the Log contains no more than a short simple record of what took place, and does not provide information on how or why things happened.

Completed Logs are sent, through the Commander in Chief Fleet, to the MOD archives at Hayes and are transferred, after 30 years, to the PRO.

Report of Proceedings

Reports of Proceedings provide information of the activities of a ship over a given period and, unlike the Logs, are narratives giving considerably more detail of selected events, including not only what happened, but also comment on how and why it happened and if it went well or badly. For instance, the Log might record that a test firing of a guided missile was conducted. The ROP would give considerably greater detail of the firing, the target, the results achieved, and, if there were problems, an analysis of what went wrong and any recommendations for improvements. If a ship suffered damage it would be specified, and the corrective measures taken recorded.

The rules for submitting ROPs are flexible (i.e. there is no specified minimum time period or information which an ROP has to include), and they are written either by the Commanding Officer (CO) of individual ships or, if ships are operating in company, by the Senior Officer of the force to cover the activities of all ships under his command. However, after active operations, individual ships invariably write their own ROPs in addition to the overall report produced by the Senior Officer.

Completed ROPs are sent to the appropriate Flag Office, and a copy is always sent to the NHB as a permanent record.

Other records

In addition to the Ship's Log and ROPs, the ship's Medical Officer maintains a Medical Officer's Journal that give details of attendances to the Medical Officer. These are sent to the Medical Director General (MDG) Portsmouth and then to Hayes for archiving.

The Fleet Air Arm has a similar record to the ROP, called the Squadron Record Book, which can be quite detailed. These are held at Yeovilton.

The NHB has many other records, which mainly relate to periods before about 1980. These include Naval Staff Histories, which list the ships involved in particular battles, operations or campaigns; Battle summary reports, usually extracted from ROPs; and Casualty Lists, which record deaths of RN personnel by ship and give a cause of death.

Documents provided

- Blank copy of a Ship's Log

Further information available from:

Naval Historical Branch
3-5 Great Scotland Yard
London
SW1A 2HW

2.5.3 Air Historical Branch

Date of Visit: 18 May 2000

Introduction

The purpose of this visit was to gain an understanding of the historical records kept by the Air Historical Branch (AHB) from the perspective of exposure assessment. This report was sent to the AHB for comment, but none was received.

The AHB is located in Great Scotland Yard and has responsibility for the collection and retention of Operations Record Books (ORBs) and Campaign documents, the production of official histories of Units and Campaigns, and answering *ad hoc* queries that require consultation of ORBs. The ORB and collection of Campaign documents are described below.

The Operations Record Book

The ORB is a standard form (RAF Form 540), completed by a nominated Officer on a monthly basis, that forms a record of what has been happening at a Unit level over the past month. Although the ORB is a standard form, it is completed in a non-standard way, and so there may be variations in the level of detail between individual ORBs. As a baseline all ORBs should record who the CO is, where the Unit is based and briefly describe the Unit's role at that particular location. The ORB should also describe what has happened over the past month, any significant events, whether there have been any casualties to the Unit and the date of the occurrence. It may also contain various documents, maps or photos as Annexes. The ORB will not record everybody's duties, particularly if they are routine, nor will it necessarily record everybody who was involved in a particular event; sometimes only senior officers will be named.

Flights made are recorded on Form 541 and are attached as Annexes to Form 540. As with Form 540, not all flights made by a Unit are recorded on Form 541, particularly with aircraft such as helicopters, which move frequently from place to place, without any particularly notable events occurring. However, where flights are recorded, they typically detail the Date; Aircraft Type, Mark and Number; Names, Initials and Duties of Crew Members; Local Time Up and Down; Purpose and Details of Flight, and a Reference to Form 540 (see Air Publication (AP) 3040 for more information).

The level of detail and quality of the ORB varies considerably between Units and largely depends on the compiler. Completion of the ORB is classed as a secondary duty, and hence the time allocated to it may depend on the compiler's primary role. For example ORBs from hospital Units in the Gulf were quite detailed because the number of casualties was much lower than expected and hence the compiler probably had plenty of time to write the ORB. However, had the number of casualties been much higher, then the ORB, due to lack of time, may not have been so detailed. Indeed, ORBs may be completed several weeks after an event, which will obviously affect the detail and accuracy with which events are recorded.

Once completed, the ORB is signed by the CO, and then forwarded to AHB, which currently receives about 200 per month. At AHB the ORB is stored according to Unit and date (month) for 25 years. A computer record is maintained of ORBs received and is used to identify when Units fail to submit an ORB, which is then followed up. However, this follow up is not always successful. After 25 years the ORB is reviewed and at 30 years, security considerations permitting, it is forwarded to the PRO. The ORB is never destroyed.

Records of ORBs may also be maintained by Units; however, access to these records may be more difficult and their retention between Units may vary considerably. It should be noted that Units can be created and disbanded for operational or other purposes at any time. A Unit may only exist for the duration of an Operation, and so following up the Unit for missing ORBs can be difficult. Similarly,

Unit detachments are required to complete an ORB; however, their transient nature makes it difficult to follow them up.

ORBs are used for a variety of purposes, including the writing of official histories of Campaigns or Units, as a record to validate battle honour, pension or disability claims and as a resource for researchers. Consulting the records to establish an individual's location at a particular time can be a bit hit-and-miss, and depends on the quality of the ORB. Particularly difficult are records relating to helicopters, planes and RAF Regiment field squadrons, which move frequently, whereas it is much easier to establish the location of ground crew. However, sufficient information is needed to consult the records effectively, such as the Unit concerned and the approximate date.

Campaign documents

The AHB also collates and stores records relating to Campaigns. Following a campaign, the AHB makes a request for all documents relating to the Campaign to be forwarded to them. These may include policy and operation files, reports and photos, but may also include financial documents and personnel files. In theory all documents of importance should be forwarded to AHB, and guidance is provided through a Joint Service Publication (JSP), which details what should be retained or destroyed. However, individuals are allowed to destroy documents locally and what a Unit considers important may not always be intelligent from a historical perspective. It is also uncertain whether the JSP is read, particularly overseas, and there may be pressure not to ship too much home following a Campaign, in order to reduce shipping costs.

At AHB the documents are stored by originator (which may be by Unit, MOD Directorate, Headquarters (HQ) in Riyadh etc.) and a file index of all documents is produced (following the Gulf conflict, 36 cabinets and 60 shelf metres worth of documents were collated). The documents are retained for 25 years, after which they are reviewed and are either forwarded to the PRO or destroyed.

Army and Royal Navy Records

The ORB is unique to the RAF and is not used by the other Forces. The RN maintains ROPs, which detail a ship's location and course. The Army maintains War Diaries; however, as the name suggests, these are probably only completed in times of war.

Defence Records Organisation

The Defence Records Organisation archives files for all three Forces and the MOD and is basically a warehousing organisation located at Hayes in Middlesex. Files sent for archiving are stored according to their Directorate and file number. The name of the sender of the file and possibly the name of the file are also recorded. An enquirer would therefore require knowledge of a file in order to access it. The identification of discrete blocks of files, from say a hospital Unit, may be possible, but it would not necessarily be easy and a more detailed enquiry of the records would require an intensive manual search.

Documents provided

- Royal Air Force (1991) AP 3040. *Notes on the Compilation of the Operations Record Book (Form 540 and Annexes) 4th Edition*. Air Historical Branch, Ministry of Defence
- Form 540
- Form 541

Potential sources of further information

- Defence Records Organisation, Hayes, Middlesex — only worth visiting if sufficient time

- Naval Historical Branch

Further information available from:

Air Historical Branch
3–5 Great Scotland Yard
London
SW1A 2HW

2.6 Users of Armed Services information systems

2.6.1 War Pensions Agency

Date of Visit: 20 July 2000

Introduction

The aim of the meeting was to discuss the problems that the War Pensions Agency (WPA) encounters when trying to establish whether a claim for a war pension is valid. Its experience of the difficulties using the Armed Service personnel, medical and historical records is of direct relevance to the DERA health surveillance project.

The war pensions scheme as it operates now began after World War I and has many parallels with the Industrial Injuries Benefit Scheme. Both exist to compensate workers for injury or disease that occurred during their work. Once a service man/woman leaves they can apply for a war pension if appropriate. There is a fairly straightforward form which has to be completed giving details of both the injury or disease and the circumstances at work which the claimant feels contributed to the injury or disease, for example muscular problem or fracture occurring in Normandy in 1994 as a result of a parachute jump. If the claim is made within seven years of leaving the Service the onus is on the Secretary of State to 'disprove' the claim. After 7 years the onus is on the claimant to provide the relevant evidence. In practice, it is the WPA staff who carry out this work, that is confirm the medical diagnosis and establish the circumstances of 'exposure'. The first step is to verify that the claimant actually was in the Armed Services during the relevant period. The WPA asks the appropriate Service to verify this, using medical and personnel records. It might also seek information from the historical branches or hospitals to obtain the additional disease/injury information. It has many problems obtaining the information needed, including missing records and incomplete, inconsistent, or misleading information. For example it may needed to verify that a claimant was actually on duty or not on 'rest and recreation' (although, there may be an argument for saying that 'duty' is 24 hours). As the annual expenditure on war pensions is £1.4 billion the health surveillance project is of obvious interest to the Agency with its potential to provide more accurate and meaningful information.

Potential sources of further information

- Porton Down
- Fleet Air Arm Health and Safety
- Submarine Health and Safety
- Atomic Weapons Establishment (nuclear test veterans)

Further information available from: War Pensions Agency
Norcross
Blackpool
F45 3WP

2.6.2 Gulf Veterans' Illness Unit

Date of Visit: **07 June 1999**

Introduction

The discussion focused mainly on the problems encountered when investigating Gulf War Syndrome. Some of the issues discussed included conflict syndrome, quality assurance, historical data, medical records, pay records and exposure information

Conflict syndromes (organic and psychological)

In many conflicts these occur during the campaign but in the Gulf conflict these occurred afterwards.

Identification of those who had gone to the Gulf: lists did exist but were held on obsolete computer systems. The lists of those awarded the Gulf medal proved incomplete. The Armed Forces Personnel Administration Agency (AFPAA) now oversees the three Personnel Sections situated at Gosport (Royal Navy (RN)), Worthy Down (Army) and Innsworth (Royal Air Force (RAF)). Each has different systems for recording when staff go on an operation but a general career summary can be obtained from personnel records, including a list of postings. However, if someone is detached to another place during a posting this is unlikely to be recorded centrally. Only the Unit will know this and during an operational situation the responsibility for personnel records rests with the Unit.

Quality assurance

There was some discussion about quality problems with past record systems.

Historical data

Each of the three Service sections has its own historical branch. Each Army Unit, For example completes an annual report/historical return, which should be retained by the Army Historical Branch (HB(A)). This report is audited for completeness to see whether the Unit is fit for deployment. Similar documents are generated by the other services.

Medical records

In a peace situation procedures such as vaccinations would be systematically recorded in medical records. During deployment in an operational situation, each member of staff is issued with a form on which pre-operation medical procedures are recorded, and on which procedures occurring during deployment should be recorded.

Pay records

It was thought that pay records might also be useful for identifying personnel involved in particular operations.

Exposure information

Records were not systematically kept during the Gulf war and even records of immunisations are incomplete. The United States (US) has used exposure modelling techniques for estimating exposures from, for example oil well fire plumes. There needs to be some prioritisation of exposures regarding their potential importance, for example exposure to substances in paints might be much more widespread than, say, pesticide exposure.

Potential sources of further information

- Gulf Veteran’s Illness Unit head
- Operational Command element
- Defence Health and Safety Group
- Personnel Sections
- Chemical and Biological Warfare Group
- Salary sections

Parallel industries:

- Heavy engineering
- Merchant Navy
- Aviation industry
- Emergency services
- Chemical industry
- Transport
- Offshore
- Radiation

Further information available from:

Gulf Veterans Illness Unit
MOD Main Building
Whitehall
London

2.6.3 Defence Analytical Services Agency

Date of Visit: 22 June 1999

Introduction

The Defence Analytical Services Agency (DASA) is a Civil Service organisation. The contact is a government statistician and is responsible for the medical statistics section of DASA. Most of her work is to ensure that the routine data collection runs smoothly and accurately and to produce collated results (mainly counts and percentages) from these data.

DASA in Bath is one of six sites, with a further new one shortly to be opened. London and Bath mainly cover corporate information. Manpower modelling is carried out at Innsworth, Uphaven and Portsmouth. Abbeywood covers procurement, that is economic analysis of potential new requirements, for example tanks etc. The new one will be concerned with logistics statistics.

DASA produces annual official tri-Service statistics and responds to parliamentary questions. Corporate Information covers aircraft, search and rescue, stores, finance, health and safety, medical, official statistics, personnel and equal opportunities. Research and Surveys carries out *ad hoc*, mainly qualitative surveys (e.g. focus groups). All the DASA 'customers' are within the Ministry of Defence (MOD) and the statistician has agreements with various departments, for example the Surgeon General (SG). The Forecasting and Modelling section carries out financial modelling on prices, pay bill, recruitment and retention, career structures, aircraft accident rates, and ship's budgets. Consultancy and Rapid Reaction carries out special surveys, for example on ethnicity, stores rationalisation, performance appraisal, Gulf Health etc.

The main database developed at DASA is the Civilian and Service Statistics and Related Analysis (CASSANDRA) system, which is based on the pay and personnel system and allows linkage, through the Service personnel number, of various other databases. For the Gulf investigation it was necessary to recreate CASSANDRA for 1995.

Detailed DASA systems include:

- Manpower
- Ethnic Monitoring
- Central Health and Safety Project (CHASP) — this is an MOD Accident Reporting system
- For the SG's department:
 - Death information
 - Invaliding/medical discharge
 - Medical downgrading
- Sickness — always had to see a doctor to go off sick, no self certification

All the medical forms are kept on microfiches, which are indexed on an efficient system known as the Computer Aided Retrieval of Medical Events (CARMED) system.

Some data, for example on deaths are coded using the International Classification of Diseases (ICD) code and a standard North Atlantic Treaty Organisation (NATO) coding system for what the person was doing at the time.

All the databases have had a front end written for them so the user can easily do queries on them to obtain collated information.

The group is also starting to think about developing health indicators for the services. Most of the information dealt with comes from non-operational situations. It is working with the Army on a laptop based system for collection of data on operation. It is also working with the Navy Health Management System and is starting a project with the Office of National Statistics (ONS) to collect all the National Health Service (NHS) numbers for service personnel.

Further information available from: DASA (Med Stats)
Quay House
The Ambury
Bath
BA1 5AB

2.6.4 Defence Analytical Services Agency

Date of Visit: **2 December 1999**

Introduction

This was the second visit by IEH to DASA (see Section 2.6.3), and the purpose of the visit was to gain a more detailed understanding of the systems in use. The visit report was sent back to DASA for comment, and it was concurred that it was accurate.

A brief introduction was given to DASA and the Medical Statistics section. Within the MOD there are three main groups: service personnel, reservists and civilians; it is important to know who is being addressing for this project. For example civilians are part of CASSANDRA. However, they are not part of the medical systems, nor are reservists, unless they are drafted in as regular service personnel. As a result it is necessary to determine whether different approaches are taken for the different forces or different personnel. It is also necessary to be aware that there are different systems for peacetime and operational situations.

NHS numbers are now being routinely collected for service personnel (previously they were not) and the possibility of having service personnel flagged in NHS records as a matter of course is being investigated. However, there are potentially some ethical considerations with routine flagging which may need to be addressed before the system can be put in place.

Following the introduction IEH was shown CASSANDRA, the Manpower Analysis and Reporting System (MARS), CHASP, CARMED, and the Forces Medical Event Database (FMED) in more detail. Below is a summary of each of the systems.

Civilian and Service Statistics and Related Analyses

The Civilian and Service Statistics and Related Analyses (CASSANDRA) system is a central computer system used to collate personnel data on a monthly basis from all three forces, and from civilians working for the MOD. The database is fully searchable on all fields (see MARS).

The data held are mainly personnel information (e.g. name, rank, commission time, branch code). However the information held differs for officers and other ranks, and differs between the forces. Forms are completed when an individual joins the services, changes post and at various career development points.

Data are collected from each of the three AFPAAAs (RN, Centurion; Army, Worthy Down; RAF, Innsworth) and from various sources for civilians (civilians include Army and RAF reservists; RN reservists are not included in CASSANDRA; deployed reservists will appear in both the forces and civilian datasets). Full personnel records are sent to DASA on a monthly basis and are entered into SAS datasets, although the full personnel record may not be used. Proving tables (10–20 tables per Service per month) are then sent to the individual manpower branches to check they are correct. Usually the tables are correct within an acceptable tolerance. However, this tolerance varies between forces, and can be large (up to 100) depending on the time of the year. As a result the data only represent a snapshot of the current status of personnel.

Data are retained on CASSANDRA as monthly updates for 13 months; thereafter the data are retained as quarterly data for four years (January, April, July and October — the intervening months are deleted), and after that only the data for April each year are retained indefinitely. However, the introduction of a new mainframe system in the near future may allow the monthly data on CASSANDRA to be retained indefinitely, although there is no incentive for DASA to do so from an exposure point of view.

Manpower Analysis and Reporting System

MARS was developed as a tool to enable easy access to data held on CASSANDRA, and to free up SAS programmers. MARS allows detailed queries of the information held on CASSANDRA, down to the individual level, and allows personnel strengths (snapshots) and flows (e.g. promotions etc.) to be examined within the forces. MARS is used widely within DASA and is beginning to be used in the RN, RAF and by some civilian users.

Central Health and Safety Project

The Central Health and Safety Project (CHASP) is an MOD project and is used to collate all reported accidents occurring in the UK involving service personnel or civilians. When an accident occurs an MOD Accident Reporting Form, MOD Form 2000, is completed by the line manager and sent to a central Health and Safety Unit. At the central Unit the form is entered into a CHASP terminal (of which there are currently 50 in the UK), and the resulting disk sent to DASA, Birmingham. DASA enters the data into the central CHASP system and supplements the information from the form with information from CASSANDRA. The resulting system is fully searchable, allowing identification of individuals, or the performance of more generic queries to identify groups with high accident rates or trends. However, this system is only operational in the UK during peacetime, and there may be differing levels of reporting between Services due to the differing attitudes towards accident reporting. The RAF is thought to be very thorough in reporting accidents, whereas the Army is not.

The CHASP system has been running for between 2.5 and 3 years, and current policy is to retain data indefinitely.

Computer Aided Retrieval of Medical Documents

CARMED is a generic term for a system in which selected F Med Forms (namely Forms 1, 2, 7, 143, 143A, 144, 242, 291 and Laboratory Reports) are processed and archived. The F Med Forms are the same for all three services and are sent to DASA on a daily basis. On arrival at DASA, the F Med Forms are checked and transferred to microfiche, where they are stored indefinitely. The forms are indexed according to name and Service Number only. Records date back to 1982; pre-1982 forms are stored on microfiche in the same way as post-1982 records except that the individual forms are stored under a single generic code (code 29) rather than each form being individually listed.

Forces Medical Event Database

FMED is another SAS dataset consisting of data obtained from F Med Forms 14, 23 and 858 concerning deaths, and diseases and injuries that require hospital treatment for more than 48 hours. Deaths and diseases are coded according to ICD codes, whereas injuries are coded according to a NATO coding system. However, the data only reflect where an individual was treated and not necessarily where they received the exposure resulting in the disease or injury.

Although the system is meant to cover occurrences regardless of geographical location, often overseas F Med Forms are completed in a language other than English, and then have to be translated before being sent to DASA. As a result, some forms completed overseas do not always find their way to DASA. However, where information from the pay system indicates a death or medical discharge, checks are made to ensure the corresponding F Med form has been received and entered into the FMED system.

FMED has been operational since 1988, and is fully searchable by any number of parameters as well as allowing identification of individuals. Current policy is to retain data indefinitely; however, the present system only covers the medical events occurring while an individual is in the services; once they leave no further information about medical events is collected.

During discussions about FMED, it was pointed out that Service Number can change during a Service career, and so it may not always provide a unique identifier for an individual. For example in the Army when an individual becomes an officer their Service Number is changed to reflect their change in rank (can identify whether an individual is an officer or not from their Service Number), and the previous Service Number may be discarded or reassigned to new service personnel. This may have important implications for tracing people for retrospective exposure estimation. The system differs in the RAF in that an individual retains the same Service Number throughout their career; whether they are an officer or not, can be ascertained by whether the letter included in the Service Number comes at the end or beginning of the Service Number.

Documents provided

- *MOD Accident Reporting Form* (MOD Form 2000).
- Data dictionaries for all the fields held on CASSANDRA
- Copies of selected F Med Forms received by DASA

Potential sources of further information

- Defence Safety Policy Unit

Further information available from: DASA (Med Stats)
Room 201
Quay House
The Ambury
Bath
BA1 5AB

2.7 Examples of data systems in civilian industry

2.7.1 Rolls-Royce

Date of Visit: **9 October 2000**

Introduction

The purpose of this meeting was to gather information on the systems currently in place at Rolls-Royce (RR), Derby for the collection and retention of exposure-related information. A draft of this report was sent to RR for comment. This version of the report incorporates the changes suggested.

Rolls-Royce is a complex company with past mergers and acquisitions making it difficult to set up unified systems across the company because of differences in the historical systems of once separate companies. For instance, Check Numbers are not necessarily used across RR; department numbers can change over time (see below).

The breadth of hazards that RR workers may be exposed to is similar to that in the armed forces. These hazards are also changing as the company expands and changes. Of the physical hazards, noise and vibration are the most significant. Mobility may be a lesser issue than in the services, but some groups within the RR workforce do move around (e.g. sales and service representatives).

Personnel information

Rolls-Royce Human Resources maintains personnel records that track an employee's occupation and where they worked. These records are maintained on a mainframe system (i.e. electronically) and in hard copy. When performing retrospective studies using RR employees, it has been found that it is possible for department numbers, for instance, to be changed. This presents difficulties in assigning individuals to a work location. The individual's name is taken as their identification although there is also a Check Number (personnel number) that appears on their personnel record. Because individuals can leave and rejoin RR on a number of occasions, it is possible for one individual to have more than one Check Number. A person's personnel record gives information on the departments in which they worked and when, their Check Number, supervisor and occupation.

Medical records

Records in RR go back to the late 1950s in hard copy. These records cover pre-employment, health screening and health surveillance medical examinations. This includes medical data gathered for Control of Substances Hazardous to Health (COSHH) regulations or internal RR purposes (e.g. audiometry). The medical records of 80 000 leavers are being scanned; there are approximately 30 000 current employee records. The scanned records will establish an electronic backup. This will be searchable by name; original documents will also be retained.

Certain activities with associated hazards require specific health monitoring and individuals involved in these activities are in what is termed a 'nominal roll'. The activity should be the driving force behind defining nominal rolls but occasionally individuals with lesser exposures are unnecessarily classified in a nominal roll. The main hazards for which nominal rolls have been established are noise and vibration, although the lung function of individuals working with isocyanates is also monitored.

Exposure information

Gathering exposure information is not a routine occurrence. There is a referral system whereby the Occupational Health or Safety Department highlights an issue (for instance at the instigation of a Union representative or local manager) that requires assessment. Individuals are identified who are representative of the particular issue under consideration. A report is produced that identifies relevant

risks and sets out what improvements or actions are required to ensure safety. These recommendations are subsequently audited by an occupational health practitioner to see whether they have been implemented. Electronic, microfiche and hard paper copies of these risk assessments are kept and records of previous studies go back to the 1970s. Individuals who are deemed representative of a group's exposure are identified in the report, as is the department number. However, the focus is on the activity, not the person. A particular problem with such a broad-based company as RR is that tasks in one place may not be called the same thing in all locations. For instance, a turbine blade polisher in Derby may be called a fettler elsewhere. Also, because such a risk assessment is valid for a specific point in time, changes to the activity may require a reassessment of the activity. For instance, the task duration may change if a different method is used.

The aim is to ensure that if workers are exposed to agents, their exposure is less than 50% of the occupational exposure standard. The need for a COSHH risk assessment for a specific activity is reviewed annually. The assessment is re-appraised every five years, and the outdated version is discarded.

Rolls-Royce mortality studies

A brief outline was given of work RR has been doing on worker mortality, linking the cause of death provided on the individual's death certificate to their work history. For this RR first focused on respiratory diseases and more recently has started a study examining bladder cancers. The death certificate has to be sent to RR for pension purposes. By comparing a person's work history with their cause of death, RR aims to explore whether there are links between the two (for instance, bladder cancer related to working with mineral oils).

Software Application Programme

Rolls-Royce is introducing a mainframe software system for gathering and storing information, primarily on personnel and pay. It is hoped that health and safety issues will also link into this Software Application Programme (SAP). Building on previous work, it is hoped that a coding system will be incorporated into SAP in order to monitor and manage work absence. SAP is not yet in place throughout RR. Once established, SAP will most likely be populated with data on individuals currently employed; previous employees' information will not be incorporated.

Documents provided

- Rolls-Royce Occupational Health Service. *Performance Report 1999*

Further information available from: Chief Medical Officer
Rolls-Royce plc
PO Box 31
Derby
DE24 8BJ

2.7.2 Imperial Chemical Industries

Date of Visit: **12 October 2000**

Introduction

The purpose of this meeting was to gather information on the systems currently in place at Imperial Chemical Industries (ICI) for the collection and retention of exposure-related information. A copy of this report was forwarded to ICI for comment and amendment; no reply has yet been received. Copies of two PowerPoint presentations and a user manual for the Replacement Occupational Health System (ROHSy) were provided. There is more information in these documents, particularly the manual.

ICI has had a system for the collection of occupational health information for more than 15 years. ROHSy was established approximately two years ago with the aim that it would be more than a repository for occupational health information. The previous system was uncoordinated, with information available but poorly accessible. ROHSy takes its lead from ICI Safety, Health and Environment policy.

The starting point on ROHSy is the 'area' (comparable to the concept of the COSHH assessment area). The process employed under ROHSy involves identifying the hazards in each area, the affected/exposed groups and the occupational health actions required. For instance, in a certain area, hazards could include noise and mercury exposure; the exposed group might be process operators and the occupational health action would be medical surveillance (audiometry and mercury in urine analysis). Performance measures are established for each area, rather than across ICI. This makes it possible to set performance measures more tightly to the needs and aspects of each area. By using individuals whose exposure is representative of a group of individuals it is possible to establish exposure groups. Each individual who is identified as being exposed to a particular hazard is assigned to an exposure group. The exposure group can then be subjected to particular occupational health activities. ROHSy established a tighter link between medical and hygiene information. In the past, the links between these data were looser because they had different aims and used different terminologies.

Personnel information (Demographics)

Each individual's National Insurance (NI) number is held on ROHSy, as is a unique identification (first three letters of surname, initial, month and year of birth, that is similar to driver's licence). The demographics part of the system holds information downloaded from Peoplesoft on a monthly basis. The demographics module gives start and cease dates when an individual worked in a specific location/area.

Daybook

The Daybook is an attempt to provide an electronic version of the occupational health nurse's daybook in which treatments, immunisations etc. are recorded. Information on for instance immunisations, accidents etc. is automatically forwarded to the daybook.

The system holds data on individuals' previous entries in the daybook (for the last two years).

Accidents

The accidents module is designed to classify injuries as 'minor', 'ICI classified', or 'Health and Safety Executive (HSE) notifiable' (i.e. according to Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR)). The module gathers information on the employee, the date, time and classification of injury (as classified by a computer algorithm using data entered into the system; for example a slip on stairs causing abrasions and requiring no treatment would be classed as minor; a fractured skull would be covered by RIDDOR), date and time of treatments, details of the

accident. There is also a mandatory section for a statement from the injured person; even if none is taken, 'None' must be entered into the field.

An individual's historical information is held in the accidents module (for the last two years).

Assessments module

There are six types of assessment, including chemical, physical, and ergonomic. The assessments module controls the populations of employees who can have medical surveillance, biological monitoring, hygiene monitoring and immunisations. By identifying a physical location (area) it is possible to identify which hazards and risks are present, what actions are needed to control risks and what monitoring is needed to ensure compliance. The actions to control and monitor are medical surveillance, biological monitoring, hygiene monitoring and immunisations. The module records where the assessment group is located, and where it sits within the organisation. There should only be one record for an assessment area. A recommendation has been made to use site abbreviations in the area names to ensure conflicts/duplications do not occur. If occupational health actions are required, it is necessary to define who will be affected by the action (i.e. the exposure group). Individuals' details within each exposure group are stored (i.e. under the exposure group 'tanker loaders' will be a list of all individual tanker loaders working in that assessment area and their name, date of birth (DOB), employee number, start date, end date). Each exposure group has a defined contact person.

The module can be used to say whether training is required, critical equipment and procedures, personal protective equipment (PPE), Respiratory Protective Equipment (RPE), and occupational health action required.

Some, though not all, sites gather information on the amount of specific chemicals on their site (date first used, date use ceased, amount on plant, annual usage).

Medical programme results module

Results of health surveillance or biological monitoring are entered in this module. Medical programmes consist of a number of tests, which consist individually of a number of parameters. For each identified individual in the medical programme their exposure group(s) will be identified. An individual can be assigned to more than one exposure group. Only the exposure groups the individual has been assigned to will be available in the medical programme module. Each exposure group may have more than one medical programme relating to it. Results can only be entered once all 'header' information has been entered (i.e. employees, DOB, exposure group, date, programme, programme type, programme outcome, recall date).

On a monthly basis a medical programme recall is sent to call all individuals in exposure groups who have appointments in the next month (e.g. for audiometry or other health surveillance).

The system holds information on data already input under each programme (for all medical programmes in the last two years). Historical audiometry data from the original occupational health system has also been entered into ROHSy.

Immunisation module

Immunisations are needed because some ICI employees work with human by-products or travel to tropical countries. Again, an individual must be a member of a group identified as requiring immunisation through the assessment module before their information can be entered in this module. One-off immunisations (e.g. tetanus following an accident) should not be entered in this module. The module holds information on which immunisation protocols each individual requires; an individual may be in more than one exposure group requiring immunisation. Once all 'header' information has been added, information on the immunisation itself can be added (immunisation, employee, date, time, stage, dose, batch, manufacturer, administered by).

Hygiene module

Hygiene programmes are specified in the assessment module. Only data relating to a specified hygiene programme can be entered in the hygiene module. Individuals who wear a sampler must be a member of an exposure group identified in the assessment module and subject to this hygiene monitoring. Multiple agents can be sampled in the same hygiene programme. No data on results of monitoring can be entered until all information on the individual and sample are input.

Previous results are stored in the system (from up to two years ago only).

Reports

A broad range of reports can be produced by interrogating the system. For example it would be possible to look at the percentage of smokers at a particular site or within a particular group. To ensure the exposure group information remains valid, a Population Audit is performed periodically. This checks that individuals in exposure groups are still working in those exposure groups. Another check is the Population Amendment form which tracks staff movements, joining/leaving etc. Such reports are sent to line managers/process managers for them to complete/amend and return to specified occupational health practitioners.

Note

Archive data are held in tables within ROHSy but are not interrogated by the new system. This is because not all the necessary relationships can be set up for lack of available information. For instance, to incorporate exposure data will require information such as employee name, date, time, and so on that may not be available in the archive data. Therefore, the data are not searchable by the new system. However, audiometry data were incorporated by 'shoehorning' the data and using assumed data for certain fields.

Documents provided

- Printed copies of PowerPoint presentations: 'Principles Underpinning the Occupational Health Computer System' and 'ROHSy Occupational Health Computer System: Simplistic Overview of Risk Assessment Module'
- ICI ROHSy User Manual

Further information available from:

Group SSHE
ICI Group Headquarters NW
PO Box 13
The Heath
Runcorn
WA7 4QF

2.7.3 Westlakes Scientific Consulting

Date of Visit: 9 October 2000

Introduction

Westlakes Scientific Consulting was set up in 1990 and works in five main areas.

- Occupational Health and Medical Statistics
- Policy Sciences
- Environmental Sciences
- Biotechnology
- Genetics

The Occupational Health and Medical Statistics Group provides a support service to British Nuclear Fuels plc (BNFL) to manage, monitor, report on and study the effects of occupational exposures on employees. This is partly achieved through the maintenance of Epidemiology, Occupational Health and Dosimetry Databases.

British Nuclear Fuels plc originally began as the Ministry of Supply, in time this developed into the Chemicals Inspectorate, which itself later became the UK Atomic Energy Authority (AEA). In 1972, BNFL was formed out of the Production Group of UK AEA and later in 1984 became a plc, with the UK Government as its sole shareholder. Currently, BNFL's head office is based in Risley, Warrington and it has five nuclear sites, located at: Chapel Cross, Scotland; Sellafield and Calder Hall, Cumbria; Springfields, a uranium production facility near Preston; and Capenhurst, near Chester.

The purpose of this visit was to gain an understanding of the systems in place to manage and study the occupational health data collected from BNFL. A request was made for comments on the visit report, but none was received.

Epidemiology Database

The Epidemiology Database consists of approximately 18 000 individuals who have been employed at one or more of the BNFL facilities sometime between 1940 and the present day (with <1% untraced). The database includes personnel data, medical data, dosimetry records, retrospective exposure data on asbestos, and data on smoking and sickness absence. Each individual on the database is flagged in National Health Service (NHS) records and hence, through the Office of National Statistics (ONS), data on cancer registrations and the site and morphology of cancers are obtained and included in the database*. Mortality data are also obtained from death certificates and are coded using the revision of the International Classification of Disease (ICD) code in use at the time. The ICD coding system is also used for recording morbidity and sickness absence data and the capability exists to code from between the 5th and 10th revisions of the ICD code. The systems for the collection and access to morbidity and mortality data in Scotland are, however, different from those in England, and are largely maintained by the General Register Office. The differences between the systems include both the type of data collected as well as how they are collected. As a result there are some missing data for the Chapel Cross facility.

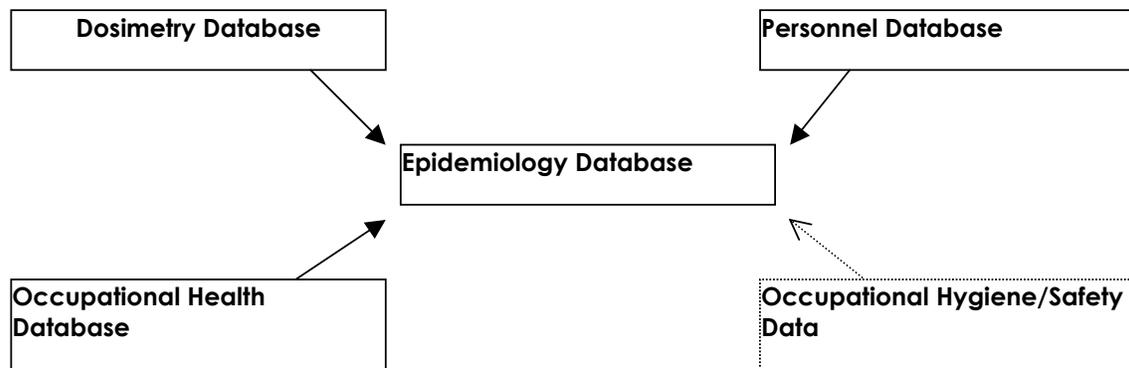
During discussions about the development of the Epidemiology database several important considerations were highlighted which need to be taken into account when developing such systems.

* It should be noted that cancer registrations are not mandatory, and hence not all cancers may be reported

- Firstly, the importance of an accurate and precise basic data set is essential. A basic data set will probably consist of an identification number, name, sex, DOB, NI number, NHS number, the start and finish dates of all periods of employment and the reasons for leaving. To this end high quality personnel records are essential, particularly for tracing individuals. The tracing of individuals at the Sellafield facility was made easier by the use of a single identification number, known as a B number, which was used for everything related to an employee at the site, for example pay, personnel, medical, dosimetry etc. At other facilities different numbers were used for different purposes, and hence several data items are required to identify individuals and match them with their records.
- Secondly, there is a need for a defining point from where data are going to be collected so all data are collected within the same time frame. If this point is in the past then there will be the need to trace each employee and collect data retrospectively.
- Thirdly, there is a need for an efficient and effective archiving system. During the development of the epidemiology database, the Occupational Health archives were re-organised at each BNFL facility, and although difficult, the benefits are usually substantial for both epidemiological and general administrative purposes.

Data for the Epidemiology database is now collected prospectively and comes from three main sources: Dosimetry, Occupational Health and Personnel (Figure 2.6). In the future it is hoped to include occupational hygiene and safety data (including risk assessments), which are currently absent from the database. The aim would eventually be to be able to study the relationship between risk assessments and sickness absence, to establish whether there are particular associations with specific risks.

Figure 2.6 Data sources for the Epidemiology Database



Selected data from each of the three main sources are updated to the Epidemiology Database at regular intervals. The data updated are largely dependent on what data are needed and what data have previously been collected, so as to prevent collecting and storing unnecessary data. Quality control and quality assurance procedures relating to the database include double data entry, accreditation to ISO 9001 for all data collection, continual checking and following-up of data and audits of the database every five years.

The database is used to study the health outcomes of the BNFL workforce. Studies carried out have included studies on exposure to radiation, the effect of shift patterns on ischaemic heart disease and on exposure to asbestos.

Occupational Health Database

Each BNFL facility has an occupational health service that provides for the occupational health needs of the facility. Before employment each employee receives a medical and data are collected on their previous exposures. The employee is then assigned one set of medical records that remains with that employee for life. If the individual leaves and later returns to work for BNFL, the medical records are archived and re-assigned; similarly if the individual moves to another BNFL facility, their records move with them. On termination of employment the records are archived indefinitely, in a manner that makes them easily accessible.

The Occupational Health Database was developed as a system to manage the occupational health data for each facility and as database for epidemiological purposes. Each site uses the same occupational health database, but the systems at each site are not linked with one another. The database itself consists of a number of areas, each of which records specific types of personnel, medical, dosimetry and exposure data (Figure 2.7). The personnel data are updated weekly from the Human Resources computer system, thus ensuring it is correct. All medical consultations and results are recorded in the database (this includes those relating to visitors and contractors), and dosimetry data obtained from the Approved Dosimetry Service (ADS). Occupational hygiene measurement data, however, are generally sparse or not recorded in the database. This is mainly as a result of an emphasis being placed on radiation exposures, due to their politically sensitive nature, which has been at the expense of other occupational hygiene data.

The database has been in use since about 1980 and all data are retained indefinitely. The data can be queried by any number of parameters, either using a built in report generator or, for more complex queries, by writing specific query programs. There is also a fully auditable trail, including details on who has changed what, when and why changes were made.

Dosimetry database

The database holds dosimetry data in the form of annual dose and individual film badge data as well as internal dose data from urine samples, which are used for back fit modelling exercises. The dosimetry data are held by the ADS as long as the regulatory requirements specify, and by Westlakes indefinitely. Dosimetry data are available on the database from 1980 onwards, prior to which dosimetry measurements are stored on paper records.

The Dosimetry Database obtains dosimetry data and matches them with personnel data from the Occupational Health or Epidemiology Database. It can't be assumed that the identification numbers used by the ADSs are the same as those used in the occupational health or epidemiology systems and so it is necessary to match individuals to their dosimetry records by other means. This is usually done by using a scoring algorithm that uses the individual's name, site number, NI number, NHS number, initials, DOB and sex to match them with the data on their dosimetry records. Each matching data item is assigned a score and when the total score for a particular match reaches a predefined level (i.e. when most of the data items match), the records are then accepted as being matched to the correct person. The system also searches for and highlights duplicate records both within and across sites so an individual is not estimated to have a higher dose than actually was the case.

The dosimetry data tend to drive the epidemiological analysis, which usually takes the form of a cohort or case-control study. When carrying out a study a chronological list of events is created for each individual, for example born, date commenced work and site, date dose acquisition began, etc., resulting in a list of about 250 events per person. The list of events is then converted to purely numerical data according to categorical data groupings for a particular aspect of an individual's life, for example for age, sex, calendar year, employer, industrial status, length of service, length of status, radiation status (i.e. plutonium or uranium), etc. Additionally, each individual is assigned to a disease group (each group consisting of a range of diseases according to ICD codes). These data are then used to compute standard mortality ratios for the exposed population as a whole, but also for specific

groups of individuals (e.g. according to age, sex, disease, etc.). These are compared with disease rates in the general population, calculated from ONS and General Registry data for England and Wales, and Scotland respectively, to identify any potential disease excesses.

Epidemiology studies

Each study is performed to an epidemiology protocol that is developed specifically for each study (see document: *Procedure for Epidemiological Research*). Data for epidemiology studies are extracted from the Epidemiology and Company Epidemiology Dosimetry System database and used to produce the epidemiology reports, which examine the dose–response relationships between the radiation exposures and disease(s) of interest. Because the studies are all retrospective the demography of the study populations cannot be changed, and so a number of confounders need to be adjusted for before analysis and comparison with the general population can be undertaken. One particular confounder is the healthy worker effect, which is enhanced in radiation workers since they receive annual medicals that help maintain a good standard of health.

Recently studies have been published on the mortality experience at the Springfields and Capenhurst facilities and on the cancer morbidity experience at the Springfield facility (see papers). Eventually it is hoped to produce a study looking at the cancer mortality and morbidity experiences at all the BNFL facilities combined.

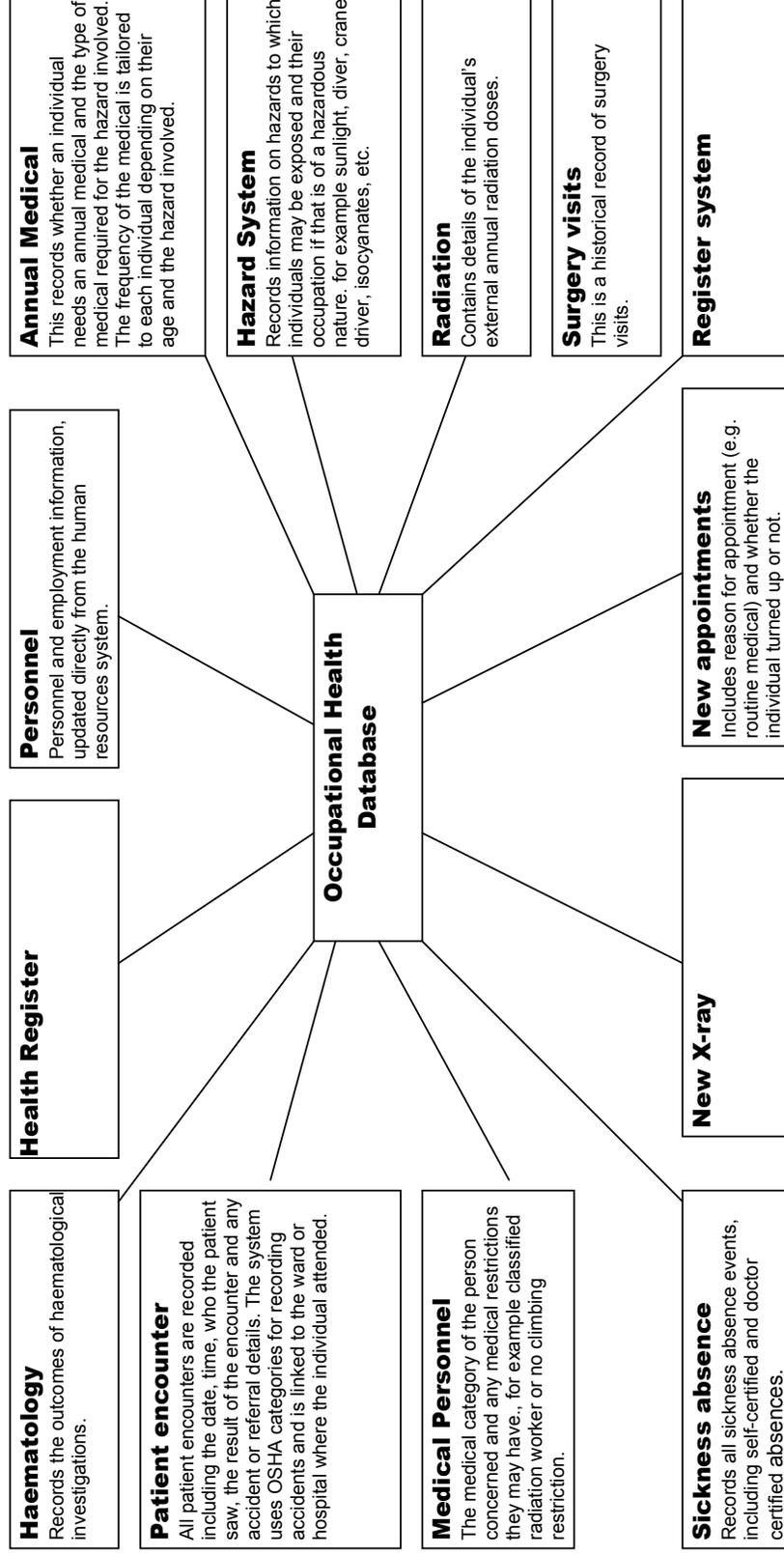
Documents provided

- Arnold L (2000) Invited Editorial: The Windscale accident — some memories and reflections. *J Radiol Prot*, 20, 255–256
- Cardis E & Richardson D (2000) Invited Editorial: Health effects of radiation exposure at uranium processing facilities. *J Radiol Prot*, 20, 65–97
- McGeoghegan D & Binks K (2000a) The mortality and cancer morbidity experience of workers at the Springfields uranium production facility, 1946–95. *J Radiol Prot*, 20, 111–137
- McGeoghegan D & Binks K (2000b) Mortality and cancer registration experience of the Sellafield employees known to have been involved in the 1957 Windscale accident. *J Radiol Prot*, 20, 261–274
- *Procedure for Epidemiological Research*, Westlakes Scientific Consulting
- Data flow chart

Further information available from:

Westlakes Scientific Consulting Ltd
The Princess Royal Building
Westlakes Science and Technology Park
Moor Row
Cumbria
CA24 3LN

Figure 2.7 Occupational Health Database



OSHA, US Occupational Safety and Health Administration

2.7.4 Health and Safety Executive

Date of Visit: 7 December 1999

Introduction

The purpose of this visit was to gain an understanding of the National Exposure Database (NEDB) used by the Health and Safety Executive (HSE) to collate exposure measurements.

The meeting began with a brief introduction to the DERA project. During this introduction it was mentioned that some work was being carried out for the US Army in developing a very extensive exposure database, which is made up of 16 separate exposure databases and is also linkable to medical records.

National Exposure Database

The NEDB is an integrated database of industrial exposures to over 400 chemical and physical agents in the UK. The database consists of approximately 100 000 samples collected by HSE staff, mainly at the request of local factory inspectors (about 90% of measurements) who have identified potential problems and a need for monitoring. The remaining measurements (about 10%) are samples that have been collected routinely. As a result the database may not be representative of normal working conditions, but may be biased towards worst-case exposures.

Of the 100 000 samples, about 20% of the data are for asbestos and were collected during routine asbestos surveys until 1983. These historical data are stored separately from the other exposure data, as different codes are used. However, the data stored are quite comprehensive and include the following fields:

- Factory Code
- Job
- Date
- Asbestos fibre dimensions (five categories)
- Peak exposure
- Respirator used (Y/N)
- Industry
- Employee Number
- Start and finish time (of sampling)
- Type of asbestos monitored
- Gravimetric sample

Asbestos data collected since about 1985/6 are not included here, but are included in the main part of the database, together with data on other chemical and physical exposures.

The remaining 80 000 samples are kept in the main part of the database and are mainly taken from completed HSE/British Occupational Hygiene Society (BOHS) Environmental Monitoring Data forms (provided). The data held on these samples date back to 1985/6, although the Occupational Hygiene Visit Reports (OHVR) have been retained since 1982. The sample data held on the database are much more detailed than that on the asbestos survey data, and include abstracts of the visit reports and a reference to the full visit report, which is accessible by HSE staff. Furthermore, all data are checked before being entered into the database, thereby ensuring quality and reliability of the data. The fields on the main part of the database include:

- Form Number
- Females Exposed

- Occupier (name and address)
- Visit Date (from/to)
- Substance (exposed to)
- Job
- Industry (classified according to Standard Industry Classification codes)
- Sample Type
- Sampling Duration (minutes)
- Biological Monitoring
- PPE (Y/N)
- OHVR Reference
- Number of People on Site
- Visit Type
- Process
- Males Exposed
- Monitoring Procedure (e.g. Method for Determination of Hazardous Substances)
- Sampling Period (from/to)
- Dermal Monitoring (Y/N)
- Local Exhaust Ventilation (LEV) (Y/N)
- Visit Report Abstract

The information held on the individual samples includes:

- Sample Type
- Sampling Duration
- Job
- Exposure Type (e.g. normal)
- Sampling Period (from/to)
- Process
- RPE (Y/N)
- Result

The database cannot identify individuals exposed (for confidentiality reasons), nor does it have any additional information on local environmental conditions or supporting data for the sampling measurements, due to the cost of obtaining such information. However, there may be important additional information contained in the visit report abstract, which is a searchable free text field. Of the 400 substances on the database α -quartz is the most common, with approximately 6000 samples, followed by total dust, toluene, styrene, xylene, lead, cobalt, respirable dust, chrysotile and cristobalite; the database also has some noise exposure measurements.

It is possible to search the database on any field, although sub-searches on selected data are not possible. Searches by the visit report make it possible to identify whether multiple substances and/or exposures were sampled. The data from the main part of the database and asbestos surveys can be imported into a spreadsheet or statistical package for analysis. Data on the occupier of the premises are not provided to external enquirers (usually Government or industry) for confidentiality reasons.

Over the past few years the rate of addition of samples to the database has slowed down, due to a shift in emphasis to the employer to monitor substances in the workplace. HSE is hoping to encourage employers to send monitoring data for inclusion in the NEDB. However, the quality of these data will have to be checked thoroughly since many of the monitoring data collected are of poor quality. Furthermore, there are some issues of anonymity that need to be overcome before employers would be willing to submit monitoring data, without the risk of prosecution.

Additional information/projects of interest

HSE is currently looking to set up an exposure database on short-term and peak exposures.

The European Chemical Industry Council is to produce a new database for the petrochemical industry on exposures. It is thought that it will contain information on both environmental and occupational exposures.

Documents provided

- HSE/BOHS *Environmental Monitoring Data form*
- HSE leaflet: *Presentation of Occupational Hygiene Data*

Potential sources of further information

- US Army
- Institute of Naval Medicine
- Directorate of Safety, Environment and Fire Policy
- Institute of Aviation Medicine (RAF)
- Offshore Safety Division, HSE (possibly not a great deal on hygiene measurements)

Further information available from: Health and Safety Executive
Magdalen House
Stanley Precinct
Bootle
L20 3QZ

Abbreviations

ABRO	Army Base Repair Organisation
ADS	Approved Dosimetry Service
AEA	Atomic Energy Authority
AESB	Army Environment and Safety Board
AFPAA	Armed Forces Personnel Administration Agency
AHB	Air Historical Branch
AMD	Army Medical Directorate
AP	Air Publication
AP3	Army Project 3
APC	Army Personnel Centre
BNFL	British Nuclear Fuels plc
BR	Book of Reference
Capt	Captain
CARMED	Computer Aided Retrieval of Medical Documents
CASSANDRA	Civilian and Service Statistics and Related Analyses
CE	Chief Executive
CESO	Chief Environment and Safety Officer
C-Form	Computer Form
CFS	Chief of Fleet Support
CHASP	Central Health and Safety Project
CO	Commanding Officer
Col	Colonel
COSHH	Control of Substances Hazardous to Health
Cpl	Corporal
CSA	Customer Supplier Agreement
DASA	Defence Analytical Services Agency
D Def Log Safety	Directorate of Defence Logistics Safety
DESAT	Dangerous Engineering Substances Advisory Team
DESC	Defence Environment Safety Committee
DESB	Defence Environment and Safety Board
DERA	Defence Evaluation and Research Agency*
DG	Director General
DGAMS	Director General Army Medical Services
DG Ops & B Dev	Director General Operations and Business Development
DLO	Defence Logistics Organisation
DNBI	Disease and non-battle injury
DOB	Date of Birth
DRIC	Defence Research Information Centre
DRPS	DERA Radiological Protection Service
DSE	Display Screen Equipment
D SEF Pol	Directorate of Safety, Environment and Fire Policy
DSMS	Defence Supply Management System
DSPS	Directorate of Staff and Personnel Support
EHO	Environmental Health Officer
EHT	Environmental Health Team
EIH	Environmental and Industrial Hazard

* Now the Defence Science and Technology Laboratory

EMIS	Egton Medical Information System
EMT	Environmental Monitoring Team
EP Pol	Environmental Protection Policy
ESG	Environmental Science Group
EU	European Union
FMED	Forces Medical Event Database
FOSF	Flag Office Surface Flotilla
GP	General Practitioner
HB(A)	Army Historical Branch
HLB	Higher Level Budget
HM	Her Majesty's
HMS	Her Majesty's Ship
HQ	Headquarters
HSE	Health and Safety Executive
HSIS	Hazardous Stores Information System
ICD	International Classification of Diseases
ICI	Imperial Chemical Industries
IEH	Institute for Environment and Health
INM	Institute of Naval Medicine
IOH	Institute of Health
ITP	Integrated Project Team
JSP	Joint Service Publication
LEV	Local Exhaust Ventilation
LSSB	Land Systems Safety Board
Maj	Major
MARS	Manpower Analysis and Reporting System
MCM Div	Manning and Career Management Division
MIA	Medical Intelligence Assessment
MIC	Medical Intelligence Cell
MSDS	Material Safety Data Sheets
MOD	Ministry of Defence
MOR	Movement Occurrence Report
MPC	Maximum Permissible Concentration
MRO	Manning and Record Office
NATO	North Atlantic Treaty Organisation
NEDB	National Exposure Database
NHB	Naval Historical Branch
NHS	National Health Service
NI	National Insurance
NIG	National Interest Group
NMA	Naval Manning Agency
NMMIS	Naval Manpower Management Information System
NMOH	Naval Medical Office Health
NOTICAS	Notification of Casualties
NSN	NATO Stock Number
OHD	Occupational Hygiene Department
OHVR	Occupational Hygiene Visit Report
OMIS	Operational Management Information System
ONS	Office of National Statistics
OOB	Out of Barracks
ORB	Operations Record Book
PAS	Personnel Administration System
PES	Physical Employment Standard
PFI	Private Finance Initiative

PHMD	Public Health Medicine Division
PIC	Posting Identification Code
PJHQ	Permanent Joint Headquarters
PMA	Personnel Management Agency
PPE	Personal Protective Equipment
PRF	Personal Record File
PRO	Public Records Office
PTW	Permit to Work
PULHHEEMS	Physical Capacity; Upper Limb; Locomotion; Hearing (left and right); Eyesight (left and right); Mental Capacity; Stability (emotional)
RAF	Royal Air Force
RDRSR	Radiation Dose Record Summary Report
RFA	Reserve Forces Act
RIDDOR	Reporting of Injuries, Diseases and Dangerous Occurrences Regulations
RM	Royal Marines
RN	Royal Navy
RORRS	Ratings and Ranks Reporting System
ROS	Record of Service
ROHSy	Replacement Occupational Health System
ROP	Report of Proceedings
RPE	Respiratory Protective Equipment
RPO	Regimental Pay Office
RR	Rolls-Royce
SAP	Software Application Programme
SC	Service Certificate
SG	Surgeon General
Sgt	Sergeant
SHEF	Safety, Health, Environment and Fire
SMBR	Senior Medical Branch Rating
SoC	Scheme of Complement
SSA	Ship Support Agency
SSI	Specialist Staff Inspection
TA	Territorial Army
TAFMIS	Training Administration and Financial Management Information System
TLB	Top Level Budget
TLD	Thermoluminescent Dosimeter
TOMIS	Theatre Operational Management Information System
UHR	Unit Historical Record
UIN	Unit Identity Number
UNICOM	Unit Computing System
UPO	Unit Personnel Office
US	United States
USA	Unit Safety Advisor
Wg Cdr	Wing Commander
WO	Warrant Officer
WPA	War Pensions Agency