Guidance on health surveillance

GUIDANCE ON HEALTH SURVEILLANCE

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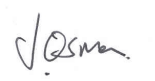
FOREWORD

Good management is the key to good health and safety, and health surveillance can be an integral part of health risk management. Where there is a risk of ill-health arising from workplace exposures, appropriate and well managed health surveillance can identify cases of disease at an early stage and improve the long term outcome for the individual. Equally importantly, the early detection of exposure related health effects indicates a need to review existing approaches to risk management and control, to avoid others being affected and to ensure compliance with the law.

The Health and Safety Executive (HSE) welcomes this initiative on the part of the Energy Institute and its Health Technical Committee. It displays the commitment to addressing risks to health from the workplace that the current HSE Strategy calls for from stakeholders in the health and safety system.

By taking this initiative forward the Energy Institute is exemplifying the partnership, leadership and competence themes within the Strategy and acknowledging the importance of creating healthier workplaces.



Dr John Osman
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Health and Safety Executive

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Project coordination and committee liaison were undertaken by Dr Jenny Lyn (Energy Institute). Formatting was undertaken by Jo Stephen (Energy Institute).

TERMINOLOGY AND ABBREVIATIONS

TERMINOLOGY

Health surveillance

A health surveillance programme is composed of a systematic set of procedures that will detect the early signs of work-related health changes that could indicate permanent damage to the individual's wellbeing. This programme may include specific medical surveillance by health professionals which in itself may include clinical examinations or biological monitoring to measure and assess both uptake and/or the effects of exposure to certain environments.

Medical surveillance

Medical surveillance is the systematic evaluation of the individual to ascertain if there have been any biological changes resulting from potential workplace exposures. Medical evaluation protocols may include clinical examination or analysis of biological parameters to ascertain whether there are effects from these exposures.

Exposure monitoring

Exposure monitoring is conducted to evaluate workplace health and safety conditions as they relate to workers' exposures to chemical, physical, and biological hazards during the time they are in the working environment. Monitoring assists management in selecting and implementing effective workplace engineering controls; developing administrative controls; and selecting, using, and determining the limitations of personal protective equipment.

Fitness testing

Evaluation programme that evaluates whether an individual is fit to perform their essential job functions. This may include presence of potentially debilitating conditions and/or physical ability to perform tasks.

ABBREVIATIONS

ACGIH BEI	American Conference of Governmental Industrial Hygienists – biological exposure indices
ACOP	Approved Code of Practice
AD	Appointed doctor (i.e. a registered medical practitioner who is, for the time being, appointed in writing by the HSE for the purposes of the regulations)
CLAW	Control of Lead at Work Regulations
CoNAWR	Control of Noise at Work Regulations
COSHH	Control of Substances Hazardous to Health
EL	Exposure limit
EMA	Employment medical advisor (i.e. a doctor appointed as an EMA under Section 56 of the Health and Safety at Work etc. Act 1974)
EMAS	Employment medical advisory service
HASAW	Health and Safety at Work Act
HAVS	Hand arm vibration syndrome
HRM	Health risk management
HS	Health surveillance
HSE	Health and Safety Executive
IRR99	Ionising Radiations Regulations 1999
MHSW	Management of Health and Safety at Work
MSDS	Material safety data sheets
NIHL	Noise induced hearing loss
OEL	Occupational exposure limit
OH	Occupational health
OHA	Occupational health advisor
OHD	Occupational health department
OHP	Occupational health physician
OHS	Occupational health service
RIDDOR	Reporting of Injuries, Diseases and Dangerous Occurrences Regulations
TWA	Time weighted average

1 INTRODUCTION

The employer is responsible for protecting the health and safety of the workforce and employees must take reasonable care to look after their own health and safety. Health surveillance is an integral part of health risk management which in itself is an important tool in meeting these responsibilities.

A health surveillance programme is composed of a systematic set of procedures designed to detect the early signs of work-related health changes that could indicate permanent damage to the individual's wellbeing. This programme may include specific medical surveillance by health professionals which in itself may include clinical examinations or biological monitoring to measure and assess uptake or the effects of exposure to certain environments.

The purpose of this document is to provide occupational health professionals with an approach to health surveillance in order to maintain the health of personnel.

In general, whilst employers are responsible for workforce health surveillance in some locations, this may be extended to include contractors where it would be impracticable for each contractor's employer to arrange, and perhaps duplicate, sophisticated occupational health programmes.

It is important that local legal opinion is sought before initiating any occupational exposure programmes regarding contractors.

2 SCOPE

This document is designed to assist employers in establishing a health surveillance programme that ensures employees receive the appropriate health surveillance for each different type of potential work-related exposure.

Detailed guidance sections (Annexes B to M) are aimed at informing medical professionals and provide instructions on how to conduct the procedures.

This document is directly applicable to UK facilities and locations, both onshore and offshore. However the general principles of risk-assessment and health surveillance apply globally where local legislation and industry standards should be considered when formulating strategies and programmes.

The guidance document is intended to provide guidance for the health surveillance component of a company's existing health and safety management system.

3 REGULATORY FRAMEWORK

Companies are responsible for taking reasonably practical steps to protect the health and safety of its workforce. Employees also have duties under section 7 of the Health and Safety at Work Act 1974 to take reasonable care for their own health and safety and co-operate with employers, where necessary, to help them comply with legal requirements. The responsibilities and minimum requirements are laid down in a range of legislation, both European and UK. A list of pertinent legislation is provided below. It should be noted that this is not an exhaustive list; rather, it is focused on that legislation relevant to this document.

Risk-specific regulations:

— Management of Health and Safety at Work Regulations 1999;

— Health and Safety at Work Act 1974;

— Control of Substances Hazardous to Health Regulations 2005;

— Control of Noise at Work Regulations 2005;

— Control of Vibration at Work Regulations 2005;

— Control of Asbestos at Work Regulations 2006;

— Control of Lead at Work Regulations 2002, and

— Ionising Radiation Regulations 1999.

These regulations are supplemented by more detailed requirements in the associated approved codes of practice.

4 HEALTH RISK MANAGEMENT

Health risk management is implemented as a continuous process comprising defined steps designed to cover all aspects of risk management. One of these is health surveillance which may be used following other steps as outlined:

— identification of potential health hazards;

— assessment of the risk;

— exposure prevention and control;

— monitoring and evaluation of control measures, and

— health surveillance.

4.1 IDENTIFICATION OF POTENTIAL HEALTH HAZARDS

The initial element is to identify potential health hazards that workers face. This can be achieved through occupational hygiene risk assessments (OHRAs) These are comprehensive in nature and typically will involve an initial qualitative evaluation of workplace exposures. Potential exposures can come from any of the following types of agents or factors:

— chemical;

— physical;

— biological;

— psychological (psychosocial), or

— ergonomic.

This includes the identification of the potentially harmful environmental/workplace agents such as benzene, metal fumes, noise, vendor-supplied chemicals that are associated with routine processes, including construction, maintenance, and turnaround work activities. This also includes infectious diseases with the potential for workplace transmission.

This also identifies the work activities, job titles and number of workers that have potential exposure to harmful environmental/workplace agents.

This initial determination is typically based on employee and supervisor interviews, work area walkthroughs, and review of occupational hygiene monitoring, chemical inventories and material safety data sheets (MSDS); and review of existing risk assessments.

4.2 ASSESSMENT OF THE RISK

The risk assessment process begins with the establishment of exposure limits. These are determined through human epidemiological studies or by testing on animals. Exposure limits are usually established by regulation in the UK (including transposition of EU limits). Some professional organisations (e.g. ACGIH) also publish occupational exposure guidelines. The objective in setting an exposure limit is to establish an exposure level at which, to the best of our knowledge, no harm will be caused to those exposed to the hazardous agent. This rider 'to the best of our knowledge' is important as the setting of exposure limits is an imprecise science. There are numerous examples of exposure limits being significantly reduced over the years and include hazardous agents such as asbestos, benzene, silica, noise and ionising radiation. This uncertainty in the effectiveness of a particular limit should inform the use of the precautionary principle when developing control measures and emphasises the important role of health surveillance in assuring their effectiveness.

There are two models in use describing the relationship between the exposure dose and severity of ill health caused.

The more frequently used model is that of threshold dose. This model assumes that there is a threshold below which no ill health occurs and above which severity of harm is proportional to dose. If this is an accurate representation of the process then ensuring exposure is below the threshold will also ensure no cases of ill health.

The alternative is the stochastic model. This assumes that there is no threshold and that the chance of ill health occurring is dependent on dose. This model is mostly used for hazardous agents that cause illnesses such as cancer and respiratory and skin sensitisation.

Again the absence of a no effect level reinforces the importance of health surveillance in capturing the earliest signs of ill health to provide the best long term protection to individual personnel.

To complete a risk assessment the following steps should be included:

— Identification of those job tasks and thereby, the individuals requiring assessment of potential exposure.

— Development of the task exposure profiles.

— Selection of relevant exposure standards.

— Development of an exposure monitoring plan and criteria for entry into a health surveillance programme.

The goals of exposure assessment include:

— Compliance with company specific occupational exposure standards, governmental standards and exposure limits.

— Characterisation of exposures to environmental/ workplace agents, including those without formal exposure limits.

— Characterisation and documentation of exposure magnitude and variability.

— Documentation of low or negligible exposures.

— Prioritisation and control of exposures with unacceptable risks.

4.3 EXPOSURE PREVENTION AND CONTROL

Written exposure control plans should be developed for the following situations:

— Worker exposures have been identified that have the potential to exceed the applicable exposure limits.

— Non-routine activities are being performed that could result in exposures that have the potential to exceed applicable exposure limits or the potential exists for atypical exposures to take place which have the potential to exceed applicable exposure limits.

4.3.1 Hierarchy of exposure control

— Eliminate the hazard/risk at the source, when it is reasonably practicable to do so. For example, if possible, change the work process or activity so that the hazardous agent is not used and there is no potential for exposure.

— Use substitution to replace a harmful environmental/ workplace agent with one that poses relatively less risk.

— Implement engineering controls at the source of the hazard/risk. For example:
  - facility and process design (e.g. process automation);
  - enclosures;
  - illumination;
  - local exhaust ventilation;
  - shielding, and
  - surface and direct transmission of infectious disease.

— Implement administrative controls. For example:
  - management of change;
  - management involvement and employee training;
  - employee work rotation;
  - maintenance and housekeeping;
  - source modification, and
  - mitigate entry of infectious disease into the workplace.

— Provide personal protection – where residual risks cannot be controlled by any of the above measures, provide for appropriate personal protective equipment (PPE) such as:

- respiratory protection;
- hearing protection;
- eye, face, hand and foot protection;
- protective clothing;
- any other identified exposure-related PPE, and
- hand hygiene supplies.

4.4 EVALUATE AND DOCUMENT THE EFFECTIVENESS OF CONTROLS

Use the following characteristics to select and periodically review control measures:

— The control, or combination of controls, achieves protection such that exposures are minimised to at least within applicable occupational exposure limits. Exposure to some agents may necessitate far more stringent controls being employed to minimise the risk of ill health following stochastic exposure.

— Worker protection is effective, reliable and consistently applied.

— Effectiveness of the control is measurable.

— The control does not create additional, uncontrolled health or safety hazards.

— Protection and control measures are compatible with the work to be completed and are accepted and correctly implemented by employees.

Documentation of control effectiveness can include the following:

— Exposure monitoring data and reporting i.e:
  - site safety and occupational hygiene survey reports;
  - occupational health illness report/summaries;
  - health surveillance examination outcomes.

4.5 HEALTH SURVEILLANCE

Health surveillance is an important part of health risk management and seeks to confirm that where employees are potentially exposed to workplace hazards, the control measures are effective and the worker is showing no biological or clinical changes that could indicate damaging exposure.

4.5.1 Monitoring and evaluation

The results of health surveillance shall be regularly assessed and reported to determine whether the impact of risk is being minimised, and to identify any potential means for reducing the risk in the first instance. Additionally, consideration shall be given to whether there is a requirement for increasing the type and frequency of health surveillance measures thereby allowing appropriate measures to prevent further harm.

With some forms of health surveillance it is possible to diagnose a work-related ill health with a high degree of confidence. Typically this relates to the exposure to sensitising agents only present in the workplace where diagnosis is confirmed using patch testing or antibody assay. With other types of ill health such as noise and vibration significant exposure is possible outside the workplace making the link to workplace exposure weaker. To some degree this problem can be addressed by reviewing the health surveillance of groups of workers with similar exposure to the hazardous agent. The identification of Similar Exposure Groups is completed as part of the Exposure Assessment.

5 ROLES AND RESPONSIBILITIES IN HEALTH RISK MANAGEMENT

Implementation of an effective health risk management system requires clear demarcation of roles and responsibilities within each company structure. The guidance provided below is based on a maximally resourced company. Other structures may dictate that roles be allocated to other groups – in any event these need to be clearly identified with accountability. Under each role are listed responsibilities attributed to that role. In certain circumstances it may be necessary to assign specific competencies to the roles – if not already inherent in the role e.g. for audiometric testing (Annex B).

5.1 TYPICAL ROLES AND RESPONSIBILITIES

5.1.1 Management

— Appointing a competent person with regard to the role of co-ordinator of a particular health surveillance programme.

— Compliance with health risk management system process.

— Overall accountability for ensuring health and safety of workforce.

— Establishment of health management system.

— Inform Occupational (Industrial) Hygienists of changes in operations affecting exposures.

— Inform Occupational Health Service of personnel changes affecting employee exposures.

— Advise contracting organisations of exposure assessment findings.

5.1.2 Functional health and safety professionals

— Implementation of health management system when required.

— Provision of information to Occupational Health Service i.e. exposure and risk assessment data.

— Maintain an inventory of chemicals in use.

— Maintain employee exposure records.

— Identification of employees (with occupational hygienists) to be included in health surveillance.

5.1.3 Occupational Health Service

— Initiating and maintaining health surveillance programmes.

— Medical management of personnel following identification of ill health.

— Providing support and guidance on all matters relating to occupational health.

— Medical examination programme and protocols are compliant with medical surveillance requirements.

— Perform and review exams and notify employees of results; if exposure-related abnormalities found, notify occupational hygienists/Management of findings.

— In conjunction with occupational hygienists, evaluate agents when new OELs established to determine appropriateness of health surveillance (exposure thresholds, exam content and periodicity).

— Provide grouped anonymised feedback to management to enable any trends to be identified and investigated.

5.1.4 Occupational/Industrial hygienist

— Develop a health exposure assessment plan in accordance with corporate requirements and undertake an annual review of the plan.

— Identify work groups and exposure potential.

— Identify tasks associated with exposure potential.

— Use qualitative methodology to prioritise enrolment in exposure monitoring and health surveillance programmes.

— Use quantitative assessments to establish exposures if required.

— Document exposure assessments, re-evaluate and follow up.

— Communicate monitoring results affecting health surveillance cohorts to OH and Management.

— Notify OH of new ELs.

5.1.5 Occupational physician

— Oversight of regular reviews of health surveillance results to identify deficiencies and areas for improvement and communicating these to the business.

— Ensure that the health surveillance programmes are designed and implemented satisfactorily.

— Medical management/referral.

5.1.6 Nurse practitioner/medic

— Undertake delivery of health surveillance examinations as required by the programme.

— Document and communicate findings to occupational physician.

— Assisting with the medical management of personnel following exposure to health risks.

5.1.7 Employees

— Be aware of hazards in the workplace and comply with company procedures including the use of control measures.

— Co-operate fully with employers in health surveillance programmes and where attempts are being made to investigate suspected problems of occupational ill health.

— Report symptoms of ill health immediately to ensure identification of any failures in control and the taking of action to prevent others being exposed to the same risk.

5.2 OCCUPATIONAL HEALTH COMPETENCY REQUIREMENTS

5.2.1 General

The health risk management process is a multi-disciplinary function designed to enable the company to maintain and monitor the health of its workforce by identifying, quantifying and controlling exposure to environmental/workplace agents that may affect the health of the workforce. Evaluation of potential workplace exposures and associated potential risks and initiating health surveillance programmes requires specific competency through specialised training and qualifications.

Companies should ensure that all employees engaged in the process should be appropriately trained and have achieved suitable competency.

5.2.2 Contractors

Contractors employed as a part of these programmes should be required by contract to also comply with the defined competencies. Always seek legal advice for situations involving contractors.

5.3 USE OF CONTRACTORS IN HEALTH RISK MANAGEMENT

Whilst it is the employer's (contractor) duty to maintain the health of its own workforce, where the workplace is controlled by the client it will be appropriate to share exposure details and health surveillance programmes with the contractor workforce so that their employers can conduct suitable and sufficient health surveillance for the employees – e.g. communication of exposure information to key contractors on an annual basis and requests that contractor companies conduct appropriate surveillance and report their results as anonymised data. These anonymised data can therefore be used to conduct a review of health risk management and controls. Contractor responsibilities will include:

— Making suitable arrangements for health surveillance for their own employees.

— Feedback anonymised health surveillance results to client.

An example worksheet for collecting health surveillance data is provided at Annex A.

6 HEALTH SURVEILLANCE

Health surveillance is appropriate where potential exposure to a workplace hazard has a known health effect and there is a validated, reproducible and measurable biological impact. Surveillance will be conducted when an exposure is identified or can be reasonably expected, or is required under legislation. These include a wide spectrum of chemical, physical and biological hazards which can be divided into general industry-related hazards such as noise, radiation, benzene and also location-specific exposures such as process-related chemicals. Health surveillance will not be conducted when there is no exposure or reason to expect an exposure unless specifically required by legislation.

6.1 GENERAL OBJECTIVES OF A HEALTH SURVEILLANCE PROGRAMME

Any health surveillance programme must be underpinned by a set of clear objectives:

— Establish baseline health parameters for all new employees to the workplace who are likely to be exposed to the identified hazards.

— Identify early health effects in an exposed population.

— Provide an ongoing programme to monitor for any deterioration in any employees who may have established health effects due to damaging exposures.

— Increase awareness amongst employees of the risks of exposure and provide information on appropriate protection/ risk prevention.

— Provide feedback to employer on the effectiveness of the health risk management programme.

— Provide a system to ensure effective feedback and the management of control measures to ensure that the health of the workforce is not further affected by workplace exposures.

6.2 TYPES OF HEALTH SURVEILLANCE

Health surveillance may take one or more of the following forms:

— Review of records and occupational history during and after exposure.

— Simple questionnaire – e.g. asking about symptoms of vibration white finger in users of vibrating tools.

— Simple examination – e.g. visual examination of the hands for dermatitis.

— Physiological tests – e.g. hearing tests to identify noise-induced hearing loss, lung function tests to look for damage to lungs from dusts or chemicals.

— Biological monitoring – e.g. measuring mercury in urine to assess exposure; benzene metabolites in the urine.

— Biological effect monitoring – e.g. analysis of red blood cells for effects of lead exposure.

— Clinical examination – clinician performing a physical examination.

6.3 FREQUENCY OF HEALTH SURVEILLANCE

Health surveillance shall be performed at appropriate intervals as defined by the exposure, or as indicated in the relevant procedure, or as defined by legislation.

— Evidence of harm may require the frequency to be increased.

— Change in work materials or process may require a change in frequency.

— Evidence that harm is not occurring may allow a reduction in frequency or removal from the surveillance programme if risk control effective.

— Change of materials or process may remove the risk factors thereby allowing the worker to be removed from health surveillance.

6.4 SPECIAL GROUPS

Special consideration needs to be given to those groups of employees whose risks may be significantly higher than others e.g. pregnant workers, employees with chronic illness.

6.5 MANAGEMENT REVIEW

Occupational health specialists shall carry out regular reviews of all health surveillance programmes with communication to management to ensure that:

— Health surveillance is being carried out in accordance with legislative and company requirements.

— Results are analysed to ensure control measures are working.

— Any new risks have been recognised and dealt with appropriately.

— Areas for improvement are identified and implemented.

6.6 RECORDS

Health surveillance records shall be kept for an appropriate period which may be determined by legislation, established practice, or following specialist advice. Where there is no existing requirement – it would be recommended that health surveillance records are held for as a minimum at least as long as the individual remains in employment, with consideration of longer as enquiries may arise some time after exposure and hence subsequent to employment. It is suggested that all records be kept for 40 years.

6.7 CONFIDENTIALITY

Medical information cannot be released to the employer unless the employee has given explicit consent.

6.8 EXAMPLE HEALTH SURVEILLANCE PROGRAMMES

Health surveillance programmes have been established to detect early signs of work-related ill health among employees exposed to certain risks. These are described in the following Annexes:

— Noise (Annex B);

— Hand-arm vibration (Annex C);

— Occupation skin disease (Annex D);

— Respiratory health (Annex E);

— Carcinogens (Annex F);

— Benzene (Annex G);

— Mercury (Annex H);

— Asbestos (Annex J);

— Lead (Annex K);

— Ionising radiation (Annex L), and

— High temperature working (Annex M).

ANNEX A
CONTRACTOR HEALTH SURVEILLANCE

Example worksheet for collecting health surveillance data.

HEALTH SURVEILLANCE REPORTING PROFORMA

Company :
Reporting Period :

Return Completed by :
Contact Details : e-mail phone:

Audio	Category	1	2	3	4	Unilateral	Total Screened
							0
HAV	Category Vascular Staging	0	1V	2V (early)	2V (late)	3V	4V	Total Screened
								0
	Sensory Neural Staging	0 Sn	1 Sn	2Sn (early)	2Sn (late)	3Sn	Total Screened
							0
Skin	Number Screened No evidence of health effect Work related skin disease *						
Respiratory	Number Screened No evidence of health effect Work related lung disease *						
Carcinogens	Number Screened No evidence of health effect Evidence of health effect						
Benzene	Number Screened No evidence of health effect Evidence of health effect						
Asbestos	Number Screened No evidence of health effect Evidence of health effect						
Lead	Number Screened No evidence of health effect Evidence of health effect						
Mercury	Number Screened No evidence of health effect Evidence of health effect						
Ionising Radiation	Number Screened No evidence of health effect Evidence of health effect						
High Temperature Working	Number Screened No evidence of health effect Evidence of health effect						

* Based on balance of probabilities following individual assessment

ANNEX B NOISE

CONTENTS

ANNEX B1
AUDIOMETRIC HEALTH SURVEILLANCE

B1.1 INTRODUCTION

Hundreds of years after its recognition, noise continues to be a serious occupational health hazard, which can damage the hearing of those exposed in the workplace. It has been recognised for some time that exposure to noise combined with individual susceptibility will result in varying degrees of high frequency hearing deficit called noise-induced hearing loss (NIHL). This occupational deafness is a progressive, chronic condition which is perhaps the most widespread of all the occupational diseases. This deafness increases with further noise exposure resulting in loss of amenity and later significant handicap, which will interfere seriously with the enjoyment of life. Hearing loss is not curable but it is preventable.

It is currently accepted that a hearing conservation programme normally comprises four areas of activity: measurement and identification of noise sources; control of noise; issue of personal protective equipment where noise control is not practicable; and health surveillance through the audiometric testing of workers at risk. It is this last topic of industrial audiometry that is of particular interest here. In an occupational setting the aim of this surveillance tool is to monitor employees and to detect those who show a deterioration of hearing that may be related to the workplace.

B1.2 HEALTH SURVEILLANCE

The Health and Safety Executive's *The Control of Noise at Work Regulations (CoNAWR) 2005* state that health surveillance is required for all employees frequently exposed above the upper exposure action values detailed within the regulations (HSE 2005). Audiometric testing shall follow the methods described in EN 26189:1991 *Specification for pure tone air conduction threshold audiometry for hearing conservation purposes*. Additionally it is considered good practice to monitor all employees who are exposed to significant levels of noise in order to recognise individuals whose hearing may be sensitive to exposure levels below the action values.

The procedure in this document follows guidance from the HSE Controlling Noise *At Work, Control of Noise at Work Regulations 2005: Guidance on Regulations (L108)*.

The objectives of an audiometric health surveillance programme can be aligned to those outlined in section 6.2 of this document. Specifically the programme should monitor the auditory status of employees and should identify any who may be developing NIHL.

B1.3 HOW TO PERFORM THE HEALTH SURVEILLANCE

B1.3.1 Components of an audiometric test

Audiometric testing requires a number of preliminary activities to be completed prior to undertaking the audiometric test itself.

B1.3.1.1 Past noise exposure

At the baseline examination it is important to obtain information about the individual's job, previous noise exposures and medical history. At all subsequent tests the individual shall be asked about any changes in personal circumstances, work patterns and noise exposure, and any complaints relating to the ears or hearing. If changes are indicated, previous records shall be revisited and amended as necessary. See Annex B.2 for a sample questionnaire.

B1.3.1.2 Otoscopic Examination

Prior to commencing the test, an otoscopic examination is required in order to clarify eardrum classification. Eardrum classification must be documented by the Medic/OHA on the audiometric questionnaire, in the employee's medical records. Full instruction on the otoscopy procedure is available in Annex B3.

B1.3.1.3 Audiometric examination – establishing a baseline

An audiometric programme should consist of a baseline audiogram conducted before employment or as soon as possible after starting where noise is a hazard, followed by a schedule of audiometric testing to monitor hearing threshold levels following exposure to noise at work. For quality control purposes it is particularly important to obtain a baseline that, as far as possible, is not contaminated by a temporary threshold shift (TTS). This reflects the importance of this initial test as a reference point for all future comparisons.

B1.3.1.4 Audiometric examination – regular review

See section B1.6.1

B1.4 CONDUCTING AUDIOMETRIC TESTING

B1.4.1 Equipment calibration

All equipment shall be maintained and calibrated according to the recommendations of EN 26189:1991 *Specification for pure tone air conduction threshold audiometry for hearing conservation purposes* and the national standard for audiometers BS EN 60645-1:2001 *Audiometers and pure tone audiometers*. In addition to the requirements of this standard it is good practice for the basic calibration to be performed annually. In summary, this

standard requires that a listening check shall be undertaken daily before use and an experienced person with good hearing shall listen at each frequency and at three sound intensities to ensure that no extraneous noise is generated by the apparatus. The audiometer and earphones should be assessed and calibrated annually by the supplier.

B1.4.2 Test environment

EN 26189 describes the criteria which shall be met in test rooms to prevent test tones being masked by ambient sound levels. It is usually necessary to use an audiometric soundproof booth to achieve acceptable listening conditions.

B1.4.2.1 Competency

The hearing conservation co-ordinator should have achieved 'competency' status through an approved training course or syllabus.

The hearing conservation co-ordinator should have achieved a certificate of competence approved by the British Society of Audiology. A training syllabus for industrial audiometricians has been prepared by the British Society of Audiology which has approved a number of courses (www.thebsa.org.uk).

B1.4.3 Audiometric test procedures

Perform the audiometry according to the type of audiometric equipment being used and with reference to the maker's instructions. See Annex B4.

B1.5 ASSESSMENT OF RESULTS

B1.5.1 Initial audiogram assessment

The initial assessment of an audiogram will normally be made by the person conducting the test. The results of previous audiograms shall be available for comparison.

The tester shall then consider:

— Whether any immediate action is required.

— What information the audiogram gives about the change in hearing level and its rate of progression.

B1.5.2 Method for evaluating audiograms

B1.5.2.1 HSE Categorisation Scheme

The HSE categorisation criteria are one of a number of screening tools. Some aspects of the scheme may be less sensitive in diagnosing early hearing loss therefore other alternative methods including physician review of the audiogram may need to be employed. Other screening tools may also be helpful for this.

To help with the initial assessment, interpretation of the audiogram and to guide the tester as to the appropriate action to take, a categorisation scheme has been developed by HSE. This scheme replaces that previously endorsed in HSE guidance note MS26.

In this scheme, the criteria for audiometric classification are based on a summation of the hearing levels obtained at 1, 2, 3, 4 and 6 kHz. This calculation shall be done for each ear separately. This sum of frequencies has been chosen as being representative of the effects of NIHL. There are other calculations for rapid hearing loss and to identify if any unilateral loss.

Each category has a descriptor relating to the condition of an individual's hearing and advises what steps shall be taken next. Refer to Annex B5 for details of the four categories.

B1.6 ACTIONS FOLLOWING CATEGORISATION

All individuals shall be given advice regarding the effect of noise on hearing and the correct use of hearing protection as part of the health surveillance programme.

Where the individual falls within category 2, 3, 4 or has unilateral loss, a formal notification should be given to that employee regarding the presence of hearing damage (Annex B6). This includes reference to the extent and implication of the damage and ways in which to minimise or prevent any further damage or loss. Retraining and reinforcement of the correct use of hearing protection and the importance of complying with other hearing conservation methods provided by the employer are the main points to stress. It is recommended that this information be given verbally, while being supported by written documentation with the employee being given a copy of their audiogram for future reference. A hearing protection information sheet is provided in Annex B6 -1. Companies, in collaboration with OHD, may wish to customise the text to take into account any relevant in-house risk management protocols.

Arrangements and procedures shall be put in place for medical referral of those individuals falling into Categories 3 and 4, and where unilateral hearing loss is identified.

In these circumstances the following actions are also required:

— Repeat the audiometry as soon as practicable to ensure no error and use opportunity to discuss the result again with the employee. As a quality control measure should repeat any audiogram showing a difference of more than 10 dB at any frequency from the previous result.

— Give copy of the audiogram to individual together with audiometer letters – category 3 or 4 for the individual (Annex B6 – 4, 5) and letter to GP (Annex B6-2).

— Look at noise monitoring maps or exposure monitoring data for that individual's job/work location (if information is available).

— Arrange personal noise dosimetry for each of these employees.

— Review individual's use of personal hearing protection and consider use of double protection e.g. helmet mounted muffs plus plugs.

— Explore other sources of noise exposure e.g. hobbies – enjoying loud music on personal headsets/motorcyclist/shooting.

— The employee should be informed that their case will be logged as part of the health surveillance programme (continual review of health programme). Each case should be logged as with an anonymised case number i.e. employee ID numbers should not be used.

— Provide feedback to OHP once actions have been completed.

B1.6.1 Further audiometric assessments

The schedule of audiometric testing shall include annual tests for the first two years of employment and at three-yearly intervals thereafter. More frequent testing may be required if significant changes in hearing levels are detected or exposure conditions change, increasing the risk of hearing damage.

Where a workforce is already exposed to noise before the audiometric programme begins, the baseline audiogram will simply be the first test to be made. If there is evidence of hearing loss, subsequent testing can follow the suggested schedule. Where damage is detected at the baseline, actions taken shall follow the advice given above.

For those audiograms in categories 1 and 2, it is desirable to make an assessment of the rate of progression of any changes due to noise exposure. This is to provide an early warning of damage in cases where hearing loss develops at a rate greater than might be expected due to age and gender, but where the referral criteria have not been reached.

Where audiometric results have not triggered a referral, but it is clear that hearing loss has become a handicap to the individual, it may be appropriate to consider referral. This hearing loss may not indicate anything other than normal ageing. Referral to a medical practitioner will enable a full examination to determine whether provision of a hearing aid may be of benefit. Medical referral is also appropriate where an individual reports symptoms such as ear pain, discharge, dizziness, severe or persistent tinnitus, fluctuating hearing impairment or a feeling of fullness or discomfort in one or both ears.

B1.6.2 Future work in noisy environments

Following referral, if noise-induced hearing loss is deemed to be stable, continuing exposure to noise will usually be acceptable where adequate hearing protection is used and where residual hearing ability is not so poor as to make further hearing loss unacceptable. In exceptional circumstances the occupational health physician may indicate to the employee that they should avoid all further occupational noise exposure. This would only be likely if the individual is severely disabled or where working in safety critical roles

B1.6.3 Record-keeping

If operating in an off-shore installation, then copies of the following records shall be kept offshore for core employees:

— any questionnaires completed;

— the audiogram results, and

— any assessments made of the results.

Originals shall be sent to (on-shore) OHD to be stored together with the individual's occupational health record. Original records shall be kept up-to-date as long as the employee remains under health surveillance. Employers shall keep the health records for the lifetime of the individual as enquiries regarding the state of an individual's hearing may arise many years after exposure to noise has ceased.

B1.6.4 Continuous review

Business units should be given anonymised grouped data on the hearing of the workforce to advise them of the effectiveness of their noise-control measures. This can be done in a way that does not reveal details of any particular individual's hearing threshold and does not compromise the issue of confidentiality. Consent will not be required for this type of information to be provided.

ANNEX B2 AUDIOMETRY QUESTIONNAIRE

Part 1 To be completed and signed by patient.

Surname: ..... Date of Birth: .....

Company: ..... Department: .....

Job Title: .....

Occupational History:

No	Dates Worked		Company	Job Title
	From	To		
1				
2				
3				
4				

Occupational Exposure to Solvents (Potentially Ototoxic):

Yes/No

Hearing Protection:

Do you wear ear protection when advised?	Yes/No
Have you worn ear protection in previous employment?	Yes/No

Medical History:

Do you consider your hearing to be good/fair/poor?		Good/Fair/ Poor
Do you have to have the TV/radio on louder than the rest of your family?		Yes/No
Do you have difficulty hearing when there is a lot of background noise?		Yes/No
Any history of:	Being knocked unconscious?	Yes/No
	Dizziness or vertigo?	Yes/No
	Hearing loss due to an illness?	Yes/No
	Treatment for TB or malaria?	Yes/No
	Ear problems in the past?	Yes/No
	Deafness in the family?	Yes/No
	Exposure to gunfire or explosions?	Yes/No
	Exposure to noise in a previous occupation?	Yes/No
	Exposure to noise in your leisure activities, e.g. at concerts, motorcycles, shooting, DIY?	Yes/No
Do you take tablets or medicines for any reason?		Yes/No

If you have answered YES to any of the above, please give further details below.

Declaration

I declare that the answers given in this form are true to the best of my knowledge and belief. I consent to information regarding the state of my hearing being passed to my employer.

Signature: Date:

Part 2 To be completed by Medical/Nursing Staff.

Audiometer make, model and serial number:	

Noise exposure previous 16 hours before test:	
Hearing protection worn on day of test:	None/Plugs/Muffs
Previous noise exposure including work, armed services and leisure:	
URTI	Yes/No
Date of previous audiogram:	

Otoscopic Examination:

It there wax in the external meatus?	Yes/No
Any abnormality of the external meatus?	Yes/No
LEFT	Drum fully visible/partially visible/not seen
RIGHT	Drum fully visible/partially visible/not seen

Is the tympanic membrane?	
LEFT	Normal/scarred/dull/retracted/perforated/not seen
RIGHT	Normal/scarred/dull/retracted/perforated/not seen

Rinne (if indicated): AC>BC	R L	YES/+ve/-ve/false -ve YES/+ve/-ve/false -ve	

Weber (if indicated):	LEFT/CENTRAL/RIGHT	

Audiometry Category:			
Sum of hearing levels at:	Left	Right	Change since previous record:
1, 2, 3, 4 and 6kHz			No change ☐
3, 4 and 6kHz			Improvement ☐
1, 2, 3 and 4kHz			Deterioration ☐
Overall			

Comments:

Action

Refer to Physician ☐
Advice on hearing protection ☐
Hearing conservation advice ☐
Repeat audiogram advised ☐ Date .....
3 months/6 months/1 year/2 years/next medical

	OH Nurse	OH Physician
Signature:	.....	.....
Date:	.....	.....

ANNEX B3
OTOSCOPY

B3.1 INITIAL EXAMINATION

The ear and eardrum is examined by the Medic/OHA prior to the individual undergoing audiometric testing. The examination is carried out to observe the eardrum and classifying it according to condition and to observe the outer ear to establish if there are any abnormalities.

Otoscopically, the outer ear and eardrum are visible with the long process of the malleus (hammer) embedded in the eardrum being partially apparent. This ossicle (the malleus) is in-drawn producing a dent in the middle of the eardrum and a reflected cone of lights runs downwards and forwards from its tip. The translucent eardrum may also give a view of the incus (anvil) and occasionally the stapes (stirrup).

The following should be looked for:

— A clear canal, with a normal drum visible, the normal appearance.

— The presence of wax. The classification system to be used is as follows:

O	Canal clear
+	Little wax present
++	Significant wax present, but drum visualised
+++	Canal completely blocked, drum not visible

— Evidence of inflammation, redness or swelling of the lining of the canal or the eardrum.

— Indrawing or pushing out of the eardrum.

— The valsalva test can be performed to check on normal movements of the ear drum. This is done by asking the individual to firmly grip their nostrils between thumb and finger and then attempt to blow their nose; this should make their ears 'pop'. The drum should be seen to momentarily bulge outwards. If no movement is observed, record findings on audiogram questionnaire.

B3.2 OTOSCOPY PROCEDURE

— Explain the procedure to the individual and obtain their consent and co-operation to carry out the procedure.

— Ensure the individual is seated in a comfortable position.

— Ask the individual if they have had a recent upper respiratory infection and record in the appropriate section.

— Switch the otoscope on and ensure the light is shining brightly. Select the appropriate size of ear piece (specula) for the individual and attach to the instrument.

— The pinna should be gently but firmly held and gently lift the external ear upwards and outwards, in order to straighten the auditory canal.

— Place the specula gently into the outer edge of the auditory canal and look through the lens.

— Position the otoscope so the light shines onto the eardrum.

— Looking through the lens, observe the eardrum and the auditory canal. Gently remove the specula from the ear.

— Record findings in the appropriate space on the audiometry questionnaire form.

— Advise the individual as to the findings and prepare him/her for audiometric testing.

Table 1 Classification of eardrum

Class	Condition of eardrum
A	Drum intact and completely normal: a) Good texture. b) No fibrosis. c) No retraction. d) No distortion of cone of light.
B	Drum intact but minor changes: a) Loss of lustre. b) Slight fibrosis. c) Chalk patches. d) Slight distortion of cone of light.
X	Drum intact but gross changes: a) No cone of light. b) Complete opacity. c) Gross retraction.
Y	Perforation and gross deformity. No signs of active disease.
Z	Perforation and gross deformity. Evidence of active disease.

ANNEX B4
AUDIOMETRY

B4.1 AUDIOMETRY TEST PROCEDURES

There are many models of audiometric equipment available. Please consult the operating manual to ensure that you fully understand all aspects of its operation and that you are able to carry out the audiometric screening procedure.

a. On completion of questionnaire, aural examination and drum classification, sit patient in booth or in quiet room.

b. Ask the individual to remove spectacles, earrings, chewing gum etc. Advise the patient of what will then be required. For example:

   i. In order to measure your hearing, we ask you to listen for tones in your headphones and to signal by pressing a button when you hear the tones.

   ii. The tones will be broken into a succession of pips and they will be easy to hear sometimes, but very faint at others. The tones may be low pitched, medium or high pitched.

   iii. The object of the test is to find out the very faintest sound you can hear.

   iv. All you have to remember is to press down and release the button very quickly as soon as you hear the pips.

   v. Advise the individual that the test will take approximately four to eight minutes depending on their response.

   vi. It should be emphasised that if at any time the individual feels claustrophobic during the test, they should open the door and take the headphones off.

   vii. If it is found prior to testing that the individual is claustrophobic, then in this circumstance only, the audio booth door may be left open.

c. The headphones are then placed carefully on the head by the individual. Any hair covering the ears is moved and the phones are placed centrally over the canals. Care is taken to ensure there is no collapse of the canals as this would give a false reading. The correct headphone placing is red headphone to the right ear. Headphone position shall be checked by the medic/OHA to ensure it is correct.

d. Ensure that the individual is familiar and confident with the procedure. A familiarisation test can be conducted if required. On satisfactorily completing this, the full test can be commenced.

B4.1.1 Temporary threshold shift

In order to ensure an individual is not affected by TTS it is important that he/she has not been exposed to noise for a minimum period of 16 hours immediately prior to the test. If this is not possible, particularly in cases of shift work, and audiometric testing has to be performed within this period, ear protection must be worn for the whole work period immediately preceding the audiometric test. Noise exposure must also be recorded and documented on the audiometric questionnaire (Annex B2).

ANNEX B5
HSE CATEGORISATION

B5.1 CALCULATING THE CATEGORY

Table 1 provides the relevant warning and referral thresholds for the calculations given in Table 2 which take into account the age and gender of the individual.

— Category 1 - if the sum for both ears is below the warning level then that individual will fall within Category 1 (acceptable hearing ability).

— Category 2 - if the sum for either ear exceeds or is equal to the warning threshold level for their respective age and gender, then the individual will fall into Category 2 (mild hearing impairment).

— Category 3 - if the sum exceeds or is equal to the referral level for either ear, then the individual would fall into Category 3 (poor hearing and would require referral for further medical advice).

— Category 4 - to determine whether there has been a rapid loss in hearing since the last examination, a sum of the hearing thresholds obtained at 3, 4 and 6 kHz shall be made. If the previous test was performed within the last three years and an increase in hearing threshold level of 30 dB or more (as a sum of 3, 4 and 6 kHz) is found, then this individual would fall into Category 4 (rapid hearing loss and require referral for further medical advice).

Following this logical method should result in each individual being placed into one of the four categories. Note: Interpretation of an audiogram may highlight effects other than NIHL.

— Unilateral hearing loss – a further sum shall be undertaken to determine whether the individual has any unilateral hearing loss suggesting a problem due to disease or infection. Sum the hearing levels at 1, 2, 3 and 4 kHz for both ears. If the difference between the ears is greater than 40 dB, the individual shall be advised of the finding and referred on for further medical advice This is unlikely to be occupational in cause.

Table 2 Classification of audiograms into warning and referral levels

Sum of Hearing Levels 1, 2, 3, 4 and 6 kHz				
Age	**Males**		**Females**	
	Warning Level	**Referral Level**	**Warning Level**	**Referral Level**
18 to 24	51	95	46	78
25 to 29	67	113	55	91
30 to 34	82	132	63	105
35 to 39	100	154	71	119
40 to 44	121	183	80	134
45 to 49	142	211	93	153
50 to 54	165	240	111	176
55 to 59	190	269	131	204
60 to 64	217	296	157	235
65	235	311	175	255

Table 3 HSE audiometric categories

	Category	Calculation	Action	Recall
1	Acceptable hearing ability. Hearing within normal limits.	Sum of hearing levels at 1, 2, 3, 4 and 6 kHz.	None	Three-yearly (annually for first two years if no previous noise exposure).
2	Mild hearing impairment. Hearing within 20th percentile. Such a change could be caused by noise exposure or disease.	Sum of hearing levels at 1, 2, 3, 4 and 6 kHz. Compare value with figure given for appropriate age band and gender in Table 1.	Warning issued	Repeat initially at six months. If unchanged at six months repeat in two years or at next medical. If worse refer to OHP.
3	Poor hearing. Hearing within 5th percentile. Suggests significant NIHL.	Sum of hearing levels at 1, 2, 3, 4 and 6 kHz. Compare value with figure given for appropriate age band and gender in Table 1.	Referral	New Category 3. Repeat initially at six months. If unchanged or worse at review refer to OHP. Unchanged Category 3, repeat annually.
4	Rapid Hearing Loss Reduction in hearing level of 30 dB or more, within three years or less. Such a change could be caused by noise exposure or disease.	Sum of hearing levels at 3, 4 and 6 kHz.	Referral	Category 4. 6 monthly–refer to OHP.
	Unilateral Hearing Loss. Difference between the ears is greater than 40 dB.	Sum the hearing levels at 1, 2, 3 and 4 kHz for both ears.	Referral	If new unilateral loss, refer to GP. Unchanged: repeat annually.

ANNEX B6
CORRESPONDENCE

B6.1 PATIENT INFORMATION SHEET

HEARING PROTECTION INFORMATION SHEET

Hearing ability deteriorates with age. However, exposure to high levels of noise at work or through hobbies and leisure activities over time will cause irreparable damage to hearing. Therefore high noise exposures are likely to cause deafness at an earlier age than what would be expected naturally.

You may only realise the extent of your hearing loss when it has become so bad that your family complain that you have the television too loud, or you realise you cannot keep up with conversations. This permanent hearing loss is incurable and young people can be damaged as easily as the old.

SO WHAT CAN YOU DO ABOUT IT?

Hearing loss is permanent and irreversible. However, noise-induced hearing loss is completely preventable. Your employer has put in place various systems to reduce the amount of harmful noise in your workplace. You should be aware of these systems and comply with that at all times. This may mean not entering a room or work area, keeping doors/shields/guards in place or, in some cases, where damaging noise cannot be reduced, you will be required to wear hearing protection such as ear plugs or ear muffs. Areas where hearing protection is required will be clearly marked with signs.

Your employer has provided training on how to wear your hearing protection correctly.

It will only work if used properly. It is your duty and within your own interest in protecting your hearing that you comply and wear the protection correctly at all times.

Please also be aware that any hobbies you have or leisure activities which involve noise to a level which you find yourself having to shout above are likely to be harmful.

Some examples are riding motorbikes, shooting or listening to loud music (concerts/pubs/clubs). These types of noise are just as harmful as those at work and will affect your hearing in the same way. You can therefore protect your own hearing by reducing your exposure to such harmful levels of noise outside of work.

B6.2 INFORMATION LETTER TO GP

Name:_____ **Date of Birth:**_____

Your patient attended on _____ for audiometric testing as part of *his routine company medical/*routine company health surveillance.

The result of the audiogram in accordance with HSE categorisation is:

Category 1 – Acceptable Hearing		☐
Category 2 – Mild Hearing Impairment		☐
Category 3 – Poor Hearing		☐
Category 4 – Rapid Hearing Loss	Right ear	☐
	Left ear	☐
	Both ears	☐
Unilateral Hearing Loss.		☐
Enclosed is a copy of the audiogram for inclusion in his/her medical records.		☐
Enclosed is a copy of previous audiograms for comparison.		☐
You may wish to consider referral for further investigation.		☐
Your patient has been advised to attend your surgery to discuss these findings.		☐

Yours sincerely,

_____

B6.3 LETTER TO PATIENT – CATEGORY 2

Date

PRIVATE AND CONFIDENTIAL

Name and address

Date of birth

Dear

The results of your audiometric test today have indicated that you have a 'mild hearing impairment'. I enclose a copy of this audiogram with this letter.

There are many possible causes for this:

— recent noise exposure;

— current upper respiratory infection;

— wax in ears;

— longstanding hearing loss, and/or

— noise damage.

You can prevent noise damage causing further loss by:

— being vigilant in wearing hearing protection and wearing it properly;

— ensuring you comply with any other hearing conservation procedures in your workplace, and

— reducing your exposure to excessive noise in your hobbies and leisure activities.

To enable us to monitor your hearing appropriately we would suggest repeat testing in

*six months/*two years.

Yours sincerely,

_____

B6.4 LETTER TO PATIENT – CATEGORY 3 (POOR HEARING)

Date

PRIVATE AND CONFIDENTIAL

Name and address

Date of birth

The results of your audiometric test today have indicated that you have poor hearing, i.e. worse than would normally be expected for your age.

There are many possible causes for this:

— recent noise exposure;

— current upper respiratory infection;

— wax in ears;

— longstanding hearing loss, and/or

— noise damage.

This result is *the same as/*different from previous audiograms.

*We have no previous audiogram for comparison.

We recommend that you have a repeat test carried out in *six months/*annually.

Enclosed is a copy of your audiogram and a letter for you to give to your GP so that he/she is aware of your findings. Your GP may suggest further referral to a specialist for further advice.

We would remind you that it is most important to protect your hearing in all noise hazard situations.

You can prevent noise damage causing further loss by:

— being vigilant in wearing hearing protection and wearing it properly;

— ensuring you comply with any other hearing conservation procedures in your workplace, and

— reducing your exposure to excessive noise in your hobbies and leisure activities.

Yours sincerely,

_____

B6.5 LETTER TO PATIENT – CATEGORY 4 (RAPID HEARING LOSS)

Date

PRIVATE AND CONFIDENTIAL

Name and address

Date of birth

The result of your audiometric test today indicates that you have demonstrated a 'rapid hearing loss' since your last test. This rate of loss is significant and we advise that you attend your own GP for further investigation.

We recommend that you have a further test carried out in *three months/*annually.

Enclosed is a copy of the audiogram and a letter for you to give to your own GP so that he/she is aware of today's findings.

We would remind you that it is most important to protect your hearing in all noise hazard situations.

Yours sincerely

B6.6 LETTER TO PATIENT – UNILATERAL HEARING LOSS

Date

PRIVATE AND CONFIDENTIAL

Name and address

Date of birth

The result of your audiometric test today indicates that you have 'unilateral hearing loss', which means that your hearing in one ear is much poorer than the other.

*This is a new finding and we advise that you see your own GP for further investigation of this.

*This is a new finding, possibly related to other clinical findings, and we advise that you have a repeat test in one month.

*This is a longstanding problem and we therefore recommend that you have a further audiogram in one year.

Enclosed is a copy of the audiogram and a letter for you to give to your own GP so that he/she is aware of today's findings.

We would remind you that it is most important to protect your hearing in all noise hazard situations.

Yours sincerely

ANNEX C HAND-ARM VIBRATION

CONTENTS

ANNEX C1
HAND-ARM VIBRATION HEALTH SURVEILLANCE

C1.1 INTRODUCTION

The Control of Vibration at Work Regulations 2005 require that appropriate health surveillance be provided whenever risk assessment indicates a risk of health effects to workers due to vibration. In practical terms, health surveillance will help to protect workers from the potentially disabling and irreversible effects of hand-arm vibration syndrome (HAVS) and should provide early feedback if vibration control measures are inadequate.

C1.2 HEALTH SURVEILLANCE

Health surveillance should be set up for:

— Workers who are likely to be regularly exposed to vibration above the present daily exposure action value of 2,5 m/s^2.

— Workers likely to be occasionally exposed above the exposure action value where the risk assessment identifies that the frequency and severity of exposure may pose a risk to health.

— Workers who already have a diagnosis of HAVS.

C1.2.1 Competency

Health professionals conducting surveillance for HAVS should be competent to do so. It is a complex field and the Faculty of Occupational Medicine has adopted a competency framework and training syllabus specifically for health professionals involved in the work.

Two specific roles are defined:

— The qualified person, usually an occupational health nurse specially trained and competent to undertake clinical assessment for HAVS.

— The doctor, an occupational physician competent to perform clinical examinations and diagnose HAVS. It should be noted that only the doctor is competent to formally diagnose HAVS and determine fitness for work.

C1.3 HOW TO PERFORM THE HEALTH SURVEILLANCE

The HSE recommends a tiered approach to health surveillance for HAVS, taking into account the complex nature of the condition and the relative paucity of competent specialists. The tiered approach consists, in total, of five levels, although the fifth level is optional dependent upon circumstances:

— baseline assessment;

— annual screening questionnaire;

— assessment by qualified person;

— diagnosis, and/or

— standardised tests (optional).

C1.3.1 Level 1 – Baseline assessment

— All new or existing employees should undergo surveillance before first exposure to HAV. This will provide an important baseline by which to judge any future changes. Although primarily for the benefit of the worker, such baseline assessment can be an important protection for the employer.

— All employees as above should be given written information about the dangers of HAVS and the relevant symptoms and signs. The baseline assessment should be used to educate the employee about the condition and the importance of surveillance.

— The first baseline assessment, as a minimum, can be performed using a self-assessment questionnaire in which medical history and symptoms are elicited (Annex C2). This questionnaire should be returned in confidence to the health team. Those whose questionnaire indicates no symptoms suggestive of HAVS or other pertinent medical history may proceed to work in which there is exposure to vibration. Those with positive symptoms or relevant medical history should be assessed by the qualified person or the doctor. Fitness to work with vibration will be determined by the doctor.

— Certain medical conditions in which abnormal vascular or neurological symptoms are a feature, such as Raynaud's or carpal tunnel syndrome, should not normally be permitted to work with vibration. This should be decided after appraisal by the doctor, after clinical examination if necessary.

C1.3.2 Level 2 – Annual screening questionnaire

— A simple questionnaire should be administered annually as a filtering tool to all those who are exposed to vibration risk but have not reported symptoms on previous questionnaires or assessment (Annex C2).

— Each time they complete the annual questionnaire, workers should be reminded of the seriousness of HAVS and the reasons behind the health surveillance.

Ideally, a responsible person should undertake this communication, although the questionnaire itself can be self-administered.

— The completed questionnaires should be returned to the occupational health team. Those answering 'yes' to any of the symptom screening questions should be referred to the qualified person or the doctor for further detailed assessment. Those reporting no symptoms do not need further referral, but they should continue to complete annual screening questionnaires as long as they continue to be exposed to vibration.

— It is possible that symptoms could appear for the first time, or worsen, in the interval between annual assessments. Workers must be told of the importance of reporting this promptly rather than waiting for the next routine assessment questionnaire. The HSE recommends that, after three years of reporting no symptoms on the annual questionnaire, all workers exposed to vibration be referred for consultation with the qualified person to ensure that nothing is being missed and to reinforce the education programme.

C1.3.3 Level 3 – Assessment by qualified person

— This level is initiated when a worker is referred because of symptoms reported on the baseline or annual screening questionnaire, or as the result of self referral.

— The qualified person will normally administer a more detailed clinical questionnaire and perform a limited examination. A presumptive diagnosis may be made by the qualified person, but only the doctor can make the definitive diagnosis of HAVS and its staging.

Note: the doctor may, of course, conduct level 3 and 4 assessments as one activity depending upon local arrangements and convenience, but the qualified person cannot conduct level 4 assessments.

C1.3.4 Level 4 – Diagnosis

— Formal diagnosis is made by the doctor after consideration of the level 3 findings and clinical examination.

— The formal diagnosis will inform the fitness to work decision and recommendations to the worker and management on further vibration exposure.

— The formal diagnosis will also inform management as to the need to report the case under RIDDOR. To this end, the doctor should use the precise disease description as indicated in the regulations.

— The doctor may undertake the investigations described under level 5 (below) in order to confirm/augment his diagnosis, but this is optional.

C1.3.5 Level 5 – Standardised tests (optional)

— A number of standardised tests are available to further assist in assessment of HAVS. These tests are NOT required as part of routine health surveillance, but may be carried out in those with pre-existing symptoms at the discretion of the doctor. They may be useful in monitoring changes in HAVS, but the ultimate diagnosis and staging of HAVS will remain a clinical decision of the doctor based on all available evidence. The tests require specialist training to conduct and defined equipment:

— Vascular tests:

  – Finger re-warming time after cold provocation test (CPT).

  – Finger systolic blood pressure test (FSBP).

Concern has been expressed about both tests (repeatability, robustness, specificity).

— Sensorineural tests:

  – Vibrotactile perception threshold (VPT).

  – Thermal perception threshold (TPT).

  These tests assess peripheral nerve damage by measuring perception thresholds. They are generally considered more useful than the vascular tests in assessing severity and progress of HAVS and may be useful in 'return to work' decisions.

— Carpal tunnel syndrome should be investigated in its own right and will often require nerve conduction studies. It is likely that these would be organised by the clinician managing the disorder.

C1.4 MANAGEMENT OF THE AFFECTED WORKER

Decisions about fitness to work, and modifications to work process, should be made by the doctor in consultation with the affected worker.

HAVS is clinically staged according to the Stockholm workshop scales (sensorineural and vascular criteria staged separately for each hand).

— Stage 1, the mildest manifestation, may permit continued exposure to vibration, provided the risk assessment is reviewed and exposure reduced to as low as reasonably practicable. The objective is to prevent the condition progressing to stage 2. Frequency of follow up assessment may need to be increased.

— Stage 2. Development of stage 2 symptoms is significant and every effort must be made to prevent further deterioration to stage 3 in which significant functional impairment may be present. Stage 2 sensorineural in the original Stockholm scale is very wide, with a significant difference between early and late stage 2 symptoms and prognosis. The majority of workers with late stage 2 or stage 3 symptoms will be deemed unfit for continued exposure to vibration. To help with decision making, an attempt has been made to divide stage 2 using the results from sensorineural testing. Definitions of intermittent, persistent, constant (for sensorineural symptoms)

— Stage 3 will be deemed unfit for further exposure to vibration, unless the worker is very close to retirement and fully understands the risk of continued exposure.

C1.5 STOCKHOLM WORKSHOP SCALES

Table 4 Sensorineural staging

Stage	Criteria	Assessment	
		Left hand	Right hand
0 sn	Vibration exposed but no symptoms		
1 sn	Intermittent numbness and/or tingling (with an sn test score of >3 and <6)		
2 sn (Early)	Intermittent numbness and/or tingling, reduced sensory perception (usually sn test score >/=6 and <9)		
2 sn (Late)	Persistent numbness, and/or tingling, reduced sensory perception (usually an sn test score >/=9 and </=16)		
3 sn	Constant numbness and/or tingling, reduced sensory perception and manipulative dexterity in warmth (and an sn test score >/=19)		

Definitions:

Intermittent – not persistent

Persistent – lasting > two hours

Constant – present all the time

Table 5 Vascular staging

Stage	Criteria	Assessment	
		Left hand	Right hand
0 v	No attacks		
1 v	Attacks affecting only the tips of the distal phalanges of one or more fingers – usually a blanching score of 1-4		
2 v (Early)	Occasional attacks of whiteness affecting the distal and middle phalanges of one or more fingers – usually blanching score of 5-9		
2 v (Late)	Frequent attacks of whiteness affecting the distal and middle (rarely also proximal) phalanges of one or more fingers – usually a blanching score of 10-16		
3 v	Frequent attacks of whiteness affecting all of the phalanges of most of the fingers all year – usually a blanching score of 18 or more		
4 v	As 3 v plus trophic changes		

Definitions:

Occasional – three or fewer attacks per week

Frequent – >three attacks per week

C1.5.1 Division of stage 2

C1.5.1.1 Lawson and McGeoch Systems

Lawson and McGeoch have developed a system for dividing stage 2 into early and late sub-stages using score results from the two sensorineural tests described above.

Table 6 Vibrotactile threshold tests (index and little finger) at 31,4 Hz

Threshold	Score
< 0,3 ms^2	0
>/= 0,3 ms^2 to < 0,4 ms^2	1
>/= 0,4 ms^2	2

Table 7 Vibrotactile threshold tests (index and little finger) at 125 Hz

Threshold	Score
< 0,7 ms²	0
>/= 0,7 ms² to < 1,0 ms²	1
>/= 1 ms²	2

Table 8 Thermal perception threshold test (index and little finger at 10 °C per second)

Temperature (degrees C)	Score
< 21	0
>/= 21 to < 27	2
>/= 27	4

C1.5.1.2 Clinical tests

Reduced sensory perception can be assessed by the use of Semmes-Weinstein monofilaments.

Reduced manual dexterity in the warm can be assessed using the Purdue pegboard. If such a test is positive, and the total score for the sensorineural tests is nine or greater, then a score of 10 is added to the total result for sensorineural staging.

C1.5.1.3 Absence of standard tests

In the absence of standardised tests, division of stage 2 sensorineural will depend on whether symptoms of numbness and tingling are intermittent or persistent and will be less precise.

ANNEX C2
SCREENING QUESTIONNAIRE

WORKERS USING HANDHELD VIBRATING TOOLS, HAND GUIDED VIBRATING MACHINES AND HANDFED VIBRATING MACHINES

C2.1 WHAT IS HAND ARM VIBRATION SYNDROME (HAVS)?

A disorder which affects the blood vessels, nerves, muscles and joints of the hand, wrist and arm; can become severely disabling if ignored and its best known form is vibration white finger (VWF) which can be triggered by cold or wet weather and can cause severe pain in the affected fingers.

Signs to look out for in Hand Arm Vibration Syndrome:

— tingling and numbness of the fingers;

— in the cold and wet, fingers go white, then blue, then red and are painful;

— you can't feel things with your fingers;

— pain, tingling or numbness in your hands, wrists and arms, and/or

— loss of strength in hands.

MEDICAL IN CONFIDENCE

SCREENING QUESTIONNAIRE FOR WORKERS USING HANDHELD VIBRATING TOOLS, HAND GUIDED VIBRATING MACHINES AND HANDFED VIBRATING MACHINES

Date:	Is this your first screening assessment? Y/N
Employee name:	Date of previous screening (if applicable):
Occupation:	Employer Name:
DOB:	NI no:

1	Have you been using handheld vibrating tools, machines or hand-fed processes in your job, or if this is a review, since your last assessment? (detail work history overleaf) If NO or more than two years since last exposure please return the form – there is no need to answer further questions.	Y/N
	If YES:	

	a) list year of first exposure	
	b) when was the last time you used them? (detail work history overleaf)	
2	Do you have any tingling of the fingers lasting more than 20 minutes after using vibrating equipment?	Y/N
3	Do you have numbness or tingling of the fingers at any other time?	Y/N
4	Do you wake at night with pain, tingling, or numbness in your hand or wrist?	Y/N
5	Have any of your fingers gone white* on cold exposure? *whiteness means a clear discoloration of the fingers with a sharp edge, usually followed by a red flush Photograph of blanching	Y/N
6	If yes to question 5, do you have difficulty re-warming them when leaving the cold?	Y/N
7	Have you noticed any change in your response to your tolerance of working outdoors in the cold?	Y/N
8	Do your fingers go white at any other time?	Y/N
9	Are you experiencing any other problems with the muscles or joints of the hands or arms?	Y/N
10	Do you have difficulty picking up very small objects e.g. screws or buttons or opening tight jars?	Y/N
11	Have you ever had a neck, arm or hand injury or operation? If so give details	Y/N
12	Have you ever had any serious diseases of joints, skin, nerves, heart or blood vessels? If so give details	Y/N
13	Are you on any long term medication? If so give details	Y/N

14	Has anything changed about your health since the last assessment? (leave blank if this is your first assessment)	Y/N

OCCUPATIONAL HISTORY	
Dates	Job title
I certify that all answers given above are true to the best of my knowledge and belief.	
Signed:	
RETURN IN CONFIDENCE TO:	

ANNEX D OCCUPATIONAL SKIN DISEASE

CONTENTS

ANNEX D1
OCCUPATIONAL SKIN DISEASE HEALTH SURVEILLANCE

D1.1 INTRODUCTION

Occupational skin disease is common. A recent survey in the UK identified some 56 000 cases of skin disease believed to be caused by work, and a further 41 000 made worse by work. In excess of 2 000 new cases are believed to develop every year in the UK

In practice, three main types of skin disease are most frequently encountered due to work exposure:

— Irritant contact dermatitis;

— Allergic contact dermatitis, and/or

— Contact urticaria.

Of these, irritant contact dermatitis is by far the most common, but it is important that a correct diagnosis be made as management of the affected individual within the workplace may be quite different depending on the type of disease.

D1.1.1 Risk assessment

Employers should make an assessment of the risk of skin damage due to exposure to substances or processes encountered at work. In the UK, this is an obligation under the COSHH Regulations (for substances) and MHSW Regulations.

General guidance on possible substance irritants or sensitisers should be available in MSDS and other publications and advice may always be sought from an occupational health and safety advisor or occupational hygienist. However, it is important to remember that processes such as frequent wetting of hands or contact with abrasive material may in itself cause skin damage or make the skin more susceptible to damage from other agents. In addition, the enormous variation in individual response, and the prolonged intervals between first exposure and disease occurrence should always be considered – an old familiar substance may still give rise to problems after years of apparent trouble-free use.

D1.1.2 Risk management

Risk assessment will indicate where further control of risk is required. The usual procedure of risk management should be adopted with elimination, substitution, etc. However, excessive reliance on personal protective equipment is discouraged, and when necessary as a final protective measure choice of correct gloves for the substance and conditions is vital. In addition, it is most important that employees have free access to adequate hand-washing

and drying facilities. Barrier creams should only be a minor adjunct in protection from substances, but should be available when appropriate, together with moisturising creams. Again, choice of barriers and creams should ensure that they themselves do not contain sensitisers:

— Usual hierarchy of risk reduction (elimination, substitution etc).

— Education of exposed employees.

— Hand washing and drying facilities.

— Select appropriate gloves when necessary.

— Chose barrier creams and moisturisers that are not sensitisers themselves.

D1.2 HEALTH SURVEILLANCE

Health surveillance by a medical practitioner is mandatory by law (in the UK) for two industrial processes, neither of which is likely to be encountered within UK oil industry activities (processes involving vinyl chloride monomer and the manufacture of patent fuels from pitch). However, employers should arrange health surveillance for employees whenever they are exposed to substances with potential to damage the skin under conditions where there is reasonable likelihood of such damage. The legislation in the UK mainly applies to substances causing dermatitis or skin cancer, but a responsible employer would also include the other dermatoses (listed later).

Responsible persons should be appointed who are trained to inspect employees' hands for signs of dermatoses. These responsible persons should have access to a trained health professional (occupational health nurse or doctor) to whom they can refer suspected cases. In addition, all at risk employees should be educated about the risks and trained in self inspection of their skin.

Frequency of surveillance will depend on the substance involved and the degree of exposure. Advice of an occupational health professional should be sought in determining such frequency.

D1.3 HOW TO PERFORM HEALTH SURVEILLANCE

This section summarises the procedures for health surveillance of skin – dermatitis:

— Identify possible irritants, sensitisers or carcinogens, using MSDS and occupational health advice.

— Identify those exposed and degree of risk.

  – Remember frequent wetting or abrasion.

  – Remember possible long lag time.

  - Re-assess at fixed intervals and when changes to chemical or process occur.

— Those at risk of exposure (unless such exposure is trivial or extremely rare) should be entered into a health surveillance programme. The frequency of surveillance will need to be determined in consultation with an occupational physician.

— Workers should receive information about possible skin disease, education about its cause, detection and avoidance.

— Workers should be educated to perform self-inspection of their skin for signs of disease and should know whom to approach for advice and follow up.

— The responsible person will be available to assist the workers in skin inspection (or to carry it out) and will keep records of any interventions and positive findings reported to or detected by him.

— The responsible person will have access to an occupational health nurse or an occupational physician for further management of affected workers.

— A health record will be kept for all exposed workers subject to health surveillance. Those developing skin diseases should be referred to the occupational health provider and a separate clinical medical record be kept. This latter is a medical record subject to full medical confidentiality.

— An occupational physician should decide, after examination of the affected worker and with knowledge of the exposures and workplace, whether further exposure is justified or safe and what further precautions should be taken. Medical information cannot be given to management or human resources, but the doctor may pass on a recommendation as to the worker's fitness to continue exposure to a sensitising, irritant or carcinogenic substance.

— Special considerations and obligations apply to certain skin exposures (e.g. vinyl chloride), but these are unlikely to be encountered in the oil gas industry.

ANNEX D2
NOTES ON OCCUPATIONAL SKIN DISEASE AND ITS DIAGNOSIS

D2.1 OCCUPATIONAL SKIN DISEASE

D2.1.1 Irritant contact dermatitis

In this condition, the principal problem is physical-chemical irritation of the skin without major immune involvement. Almost any substance, including water, can cause skin irritation in sufficient concentration or over a long enough period. In addition, there is significant individual variation in the tendency for an irritant response to appear in relation to the same substance. The overall effect is usually due to the combined impact of several substances, often in small doses, over a long time. It is believed that there is a gradual stepwise response to repeated damage by substances, until a threshold is passed, at which point clinical signs and symptoms of skin damage appear. If sufficient recovery time is allowed between exposures it is possible that the 'clinical' threshold may not be passed at all. Conversely, once the threshold is passed, sufficient recovery time must be given to allow the skin to fall well below its clinical threshold if rapid recurrence is not to occur – usually several weeks after clinical recovery appears complete.

— Irritant effect, not allergic.

— Usually due to combined effect of many substances.

— Any chemical may cause it in sufficient concentration or over prolonged period.

— Removal from exposure must be long enough (recovery below threshold).

— Return to work with irritant chemicals may be possible if precautions taken.

D2.1.2 Allergic contact dermatitis

As the name implies the effect here is an allergic or immune response to a particular substance or substance group. The concentration of the substance need not be high, but exposure history is usually quite prolonged (minimum several weeks, sometimes years). Thus, an individual may suddenly show an allergic dermatitis response to a substance which he has been using for years without obvious problem. This may make identification of the offending substance difficult. In addition, even after sensitisation, the allergic response usually occurs two days or so after actual contact with the chemical, rather than immediately. The response is systemic – i.e. the whole body is sensitised, and areas remote from contact may be affected. The allergic response is very likely to be lifelong, and repeated exposure may lead to increasing severity of disease. All future contact with the particular substance concerned must be prevented. This may not imply a total inability to work with the substance, provided sufficient protective measures are used.

— Allergic (immune) reaction rather than simple irritant.

— Reaction is to a specific chemical rather than to the entire substance mixture.

— Allergy may occur after weeks (rare) or years of exposure.

— Allergy is lifelong.

— Areas of skin remote from contact site may be affected.

— Complete exclusion from the substance may not be essential if adequate precautions to avoid contact are taken.

D2.1.3 Contact urticaria

In this condition there is a rapid, systemic immune reaction to a particular substance which may be manifest by a widespread red, itchy rash, swelling, and in extreme cases shortness of breath and wheezing. In the extreme, there may be a life-threatening anaphylactic reaction with cessation of respiration and death. In a sensitised individual, the allergic response tends to occur within 30 minutes of contact with the substance (contrast two days for contact allergic dermatitis). The tendency to react thus is life-long, and severity of response may increase with repeated exposure. The severity of the condition and potential risk to life mean that permanent removal from even potential exposure to the substance is usually indicated.

— Allergic response rather than simple irritation.

— Reaction is to a particular chemical component rather than the whole substance mixture.

— In the sensitised, the reaction occurs within 30 minutes.

— Sensitisation is for life.

— Very low doses of substance may provoke reaction.

— Reaction may be life-threatening (anaphylactic response).

— Total removal from potential exposure usually mandatory.

D2.1.4 Other occupational dermatoses

— Oil acne – inflammation of hair follicles associated particularly with mineral oils.

— Chloracne – inflammation of hair follicles associated with polyhalogenated hydrocarbons.

— Chrome ulcers – exposure to chrome or its hexavalent salts.

— Cement burns – contact with liquid cement.

— Loss of skin colour – (clinically identical to vitiligo). Exposure to phenols and hydroquinones may lead to loss of skin pigment in patches.

— Skin cancer – topical exposure to coal tar and polycyclic aromatic hydrocarbons; systemic exposure to arsenic compounds; excess exposure to sunlight.

D2.2 DIAGNOSIS

Differential diagnosis of these conditions can be difficult, even for an expert dermatologist. There are exceptions to the guidelines above, and the clinical appearance, especially of allergic and irritant contact dermatitis can be identical. In addition, it is perfectly possible for a single individual to have both irritant and allergic dermatitis, and either of these with urticaria.

However, management may vary significantly, so it is important to get the diagnosis right whenever possible, even though irritant contact dermatitis is by far the commonest. The opinion of a clinical specialist should be sought and he or she should be provided with as much information as possible about substance exposures and protective measures. It must be remembered that allergy or irritation can and often does occur to a substance that the employee has been using for years and that the reaction to a particular exposure incident may be delayed.

Patch testing for allergic contact dermatitis and prick testing for urticaria may be very helpful investigations, but should only be carried out by a competent specialist.

ANNEX D3
SOME OCCUPATIONAL CONTACT IRRITANTS AND SENSITISERS

These lists are not intended to be exhaustive, but to provide examples. Many items can be both irritants and sensitisers. In the case of collective terms such as 'dusts', it is not implied that all dusts can harm the skin, only that certain ones can.

D3.1 SOME BROAD GROUPS OF CHEMICALS AND SUBSTANCES

Acids
Adhesives
Alkalis
Animal feed additives, e.g. ethoxyquin
Biocides, e.g. isothiazolinones
Bleaches
Degreasers
Descalers
Detergents
Diesel fuels
Disinfectants
Dusts, e.g. of angular or hygroscopic particles
Fertilisers
Flavourings, e.g. eugenol
Flour improvers, e.g. benzoyl peroxide
Fluxes
Fragrances, e.g. cinnamates
Local anaesthetics, e.g. amethocaine
Oils and greases
Oxidising agents, e.g. peroxides
Pesticides, e.g. difolatan
Polishes
Preservatives
Reducing agents, e.g. thioglycolates
Resins
Sealants
Skin cleansers
Soaps
UV absorbers, e.g. aminobenzoates

D3.2 SOME SPECIFIC CHEMICALS SUBSTANCES AND MATERIALS

Acrylates
Ammonium persulphate
Asphalt
Azo dyes
Brine
Cement
Chromates
Cobalt
Colophony (rosin)
Cresols
Cyanoacrylates
Dimethacrylates
Epoxy resins and hardeners
Fibreglass
Flour
Formaldehyde
Formaldehyde releasers
Formaldehyde resins
Glutaraldehyde
Hydrazine
Hydrofluoric acid
Hypochlorites
Isocyanates
Kerosene
Lime
Methacrylates
Neat oils
Nickel
Organic Solvents
Organotin compounds
Paraffin
Permanent wave solutions
Phenols
Quinones
Rubber processing chemicals
Shampoos
Soluble oils
Styrene
Synthetic coolants
Talc
Thinners
White spirit

D3.3 SOME EXAMPLES OF BIOLOGICAL SUBSTANCES, ORGANISMS AND MATERIALS

Animal hair, saliva, tissues
Aquatic organisms, e.g. bryozoans
Foods e.g. fish, garlic
Plants, e.g. Compositae
Woods, e.g. mahogany

ANNEX E RESPIRATORY HEALTH

CONTENTS

ANNEX E1
RESPIRATORY HEALTH SURVEILLANCE

E1.1 INTRODUCTION

Respiratory hazards, both respiratory irritants and sensitisers, are regularly present and in use on sites within the energy industry.

Any substance which can cause inflammation or other adverse reactions in the respiratory system (lungs, nose, mouth, larynx and trachea). Examples of respiratory irritants include tobacco smoke, ozone, sulphur dioxide or nitrogen oxides.

Irritants may cause respiratory symptoms during exposure – or exacerbate pre-existing pathology such as asthma.

A respiratory sensitiser is a substance or chemical which when breathed in has the potential to trigger an irreversible allergic reaction in the respiratory system. Once this sensitisation reaction has taken place, further exposure to the substance, even a very small amount, may produce symptoms. Sensitisation does not usually take place immediately–generally happening after multiple exposures over several months or even years of breathing in the sensitiser. The symptoms include:

— Asthma – attacks of coughing, wheezing and chest tightness.

— Rhinitis – runny or stuffy nose.

— Conjunctivitis – watery or prickly eyes.

Once an employee is sensitised, symptoms can occur either immediately after re-exposure to the sensitiser or may be delayed to several hours later. If the symptoms are delayed, they are often most severe in the evenings or during the night, so it may not be immediately obvious that it is a work-related illness.

Following sensitisation, continued exposure may result in permanent damage to the lungs and increasingly severe symptoms. People with rhinitis may go on to develop asthma. Asthma attacks are likely to become worse and can be triggered by other exposures such as tobacco smoke, general air pollution or even cold air. These attacks will often continue after exposure to the sensitiser has stopped.

Substances responsible for most cases of occupational asthma include the following:

— Isocyanates – vehicle spray painting, foam manufacturing.

— Flour/grain/hay – handling grain, milling, malting, baking.

— Glutaraldehyde – disinfecting instruments.

— Wood dusts – sawmilling, woodworking.

— Electronic soldering flux – soldering, electronic assembly.

— Latex – protective gloves for health care, motor vehicle repair, beauticians etc.

— Laboratory animals – laboratory animal work.

— Some glues/resins – curing of epoxy resins.

E1.2 HEALTH SURVEILLANCE

Health surveillance should be initiated for anyone who is potentially exposed to a process that involves potential respiratory irritants or sensitisers.

The HSE's Guidance Note MS25: *Medical aspects of occupational asthma*, proposes two levels of health surveillance that may be appropriate dependent on the degree of risk identified during the COSHH assessment.

E1.2.1 Low level surveillance

Low level surveillance is suggested where the risk is considered low, for example, where there is only weak evidence of a hazard or exposure/inhalation seems unlikely. Low level surveillance may be considered appropriate for any potential exposure to respiratory irritants.

E1.2.2 High level surveillance

High level surveillance is suggested where the evidence for a hazard is clear and where the risk is considered higher. A good example would be exposure to isocyanate during spray-painting of isocyanate paints.

E1.3 HOW TO PERFORM HEALTH SURVEILLANCE

Baseline health assessment will involve completion of a questionnaire to assess health history (Sample questionnaire E2) and the presence of any respiratory symptoms. This should be followed by a baseline assessment of lung function (spirometry).

At this time individuals should also be reminded of the importance of following good practices and of reporting any new respiratory symptoms which may indicate sensitisation.

This initial health assessment should be carried out before any exposure or potential exposure occurs; failing that, as soon as possible after an individual is identified as being at risk.

For low level risk occupations ongoing periodic surveillance takes the form of an annual health check. This may consist of repeat spirometry, or questionnaire only

(administered by post/e mail) depending on the level of risk identified by Occupational Health through risk assessment.

Higher level of risk occupations will require additional surveillance each employee should complete the questionnaire to identify potentially relevant symptoms, at six and at twelve weeks after commencing exposure and annually thereafter. Additional surveillance should also be arranged if there is an unexpected increase in exposure (e.g. following an incident). Further periodic spirometry tests may also be appropriate.

Appropriate information on the hazard, controls and arrangements for reporting symptoms should be provided to all employees enrolled in the surveillance programme.

E1.3.1 Spirometry

Lung function tests have long been recognised as one of the most important tests available to assess lung impairment. If included as part of health surveillance then spirometry must be performed by appropriately trained and competent persons to ensure the quality of testing is suitable.

Equipment used must be appropriately maintained and calibrated in accordance with the manufacturer's instructions. During spirometry, considerable skill is required on the part of the technician conducting the test to ensure the test subject receives appropriate coaching on technique. The test subject is required to continue exhalation for a minimum of six seconds and sufficient repeat attempts are required to demonstrate adequate repeatability.

E1.4 ASSESSMENT OF RESULTS

Responses to health surveillance questionnaires should be reviewed by a suitably competent occupational health worker. Before commencing health surveillance of any sort, arrangements must be in place to ensure that any individuals reporting significant symptoms are properly followed up, and this will normally involve assessment by a suitably qualified and experienced medical practitioner.

ANNEX E2

SAMPLE RESPIRATORY HEALTH SURVEILLANCE QUESTIONNAIRE

Respiratory Surveillance Questionnaire

Employee: Employee No: Date of Birth:

Job Title: Dept: Location:

Duties:

Home Address:

About Your Respiratory System

Complete questions 1 to 16			Please circle answer	
1	Do you have a troublesome cough or bring up phlegm?		Yes	No
	If Yes:			
	(i)	Do you cough frequently during the day?	Yes	No
	(ii)	Do you cough frequently during the night?	Yes	No
	(iii)	Do you seem to cough more frequently at work than at home?	Yes	No
	(iv)	Do you frequently bring up any phlegm from your chest?	Yes	No
	(v)	Do you take anything for your cough/phlegm?	Yes	No
2	Do you suffer from shortness of breath?		Yes	No
	If Yes:			
	(i)	Is your shortness of breath related to exercise/physical activity?	Yes	No
	(ii)	Is your shortness of breath related to cold weather?	Yes	No
	(iii)	Does your shortness of breath get worse when you are unwell?	Yes	No
	(iv)	Is your shortness of breath worse at work?	Yes	No
3	Does your chest ever sound wheezy or whistling?		Yes	No
	If Yes:			
	(i)	Is your wheezing related to exercise/physical activity?	Yes	No
	(ii)	Is your wheezing related to cold weather?	Yes	No
	(iii)	Does your wheezing get worse when you are unwell?	Yes	No
	(iv)	Is your wheezing worse at work?	Yes	No
4	Do you ever experience chest tightness?		Yes	No
	If Yes:			
	(i)	Does this also cause you to be short of breath?	Yes	No
	(ii)	Are you wheezy with chest tightness?	Yes	No
	(iii)	Do you experience chest tightness related to physical activity?	Yes	No
	(iv)	Do you experience chest tightness at work?	Yes	No
5	Do you have frequent episodes of blocked, itchy or runny nose?		Yes	No
	If Yes:			
	(i)	Does being at work seem to make this worse?	Yes	No
	(ii)	Do you have nasal polyps or other obstruction to the nose?	Yes	No
	(iii)	Have you had treatment or surgery to your nose?	Yes	No
	(iv)	What treatment/surgery did you receive?	Yes	No
6	Have you experienced your eyes becoming red, itchy or watery?		Yes	No
	If Yes:			
	(i)	Is this a frequent problem?	Yes	No
	(ii)	Does it seem to be worse at work?	Yes	No
	(iii)	Does it seem to be related to a particular time of the year?	Yes	No
7	Do you have any allergies?		Yes	No
	If Yes:			
	(i)	Please specify?	Yes	No

8	Do you smoke?	Yes	No
	If Yes:		
	(i) Please say if ex-smoker and when stopped?	Yes	No
	(ii) Please say how much smoked per day?	Yes	No
9	Have you ever consulted a doctor about respiratory symptoms?	Yes	No
	If Yes:		
	(i) Were you told you have asthma?	Yes	No
	(ii) Were you told it was a chest infection?	Yes	No
	(iii) Were you told it was something else (please explain)?	Yes	No
	(iv) Have you ever severely injured your chest in an accident?	Yes	No
10	Are you taking any regular medication for breathing/nose/eye symptoms?	Yes	No
	If Yes:		
	(i) Please name:	Yes	No
11	Have you been exposed to any respiratory allergens in other jobs?	Yes	No
	If Yes:		
	(i) Were you subject to respiratory health surveillance?	Yes	No
	(ii) Did you develop any health problems?	Yes	No
	(iii) Has a doctor told you that you have occupational asthma?	Yes	No
12	How long have you worked for your present company?		years
13	Do you know what the respiratory problems are in your present job?	Yes	No
	If Yes please specify:		
14	Do you have to take time away from work with respiratory problems?	Yes	No
	If Yes:		
	(i) How many days off work have you taken in the last year?		days
	(ii) Would you say this is getting worse, staying the same or improving?	worse/same/better	
	(iii) Are your respiratory problems better when on holiday/not at work?	Yes	No
15	Has it been necessary to give you any respiratory protection at work?	Yes	No
	If Yes:		
	(i) Do you always wear the protection when required to do so?	Yes	No
16	Overall, how do you consider your respiratory health to be at present?	good/fair/poor/ getting worse	

To be completed by Medic/OHA

Examination/General Appearance		**Lung Function**			
Chest shape	normal/abnormal	FEV1	actual	predicted	
Expansion	normal/abnormal	FVC	actual	predicted	
Percussion	normal/abnormal				
Breath sounds	normal/abnormal	FEV1/FVC ratio			
Finger clubbing	yes/no	(FEV1/FVC x 100 expressed in %)_____%			
Neck glands	yes/no	FEV1	actual	predicted	
Trachea	central/deviated	FEV1	actual	predicted	
Comments:		FEV1	actual	predicted	
Advice given:		Outcome:			

A	Explanation of purpose of health surveillance	Fit	Modify duties	Refer to Medical adviser
B	Explanation of respiratory sensitisers and irritants			
C	Advice on need for clean overalls and PPE			
D	Advised to report any new or works related respiratory problem			

Employee's signature: **Date:**

Medic/OHA name **Signature:** **Date:**

ANNEX F CARCINOGENS

CONTENTS

ANNEX F1
CARCINOGENS — GUIDANCE ON HEALTH SURVEILLANCE

F1.1 INTRODUCTION

A 2007 research report (HSE, RR595: *The burden of occupational cancer in Great Britain*) estimates that 4,9 % of all cancer deaths in the UK during 2004 were attributable to occupation. This amounts to 7 137 deaths. For men alone the estimate is higher still at 8,0 %. The three leading causes of cancer deaths and registrations identified were asbestos (3 840 deaths, 3 840 registrations), mineral oils (530 deaths, 2 765 registrations), and solar radiation (22 deaths, 2 557 registrations). Silica (850 deaths, 947 registrations) and diesel engine exhaust (676 deaths, 814 registrations) also featured prominently.

It is often difficult to demonstrate the causal association between occupational exposure and onset of cancer in any one individual case. The health effects of exposure to carcinogens may present for the first time many years after exposure and for many types of cancer early clinical warning signs may not be apparent. Acceptable means for the early detection of disease at a stage where complete recovery can be expected may not be available and for this reason health surveillance may be limited. The ultimate goal must therefore be that of primary prevention achieved by risk assessment and appropriate application of the hierarchy of controls. Prevention of exposure altogether via elimination or substitution is the first objective.

F1.2 HEALTH SURVEILLANCE

Unless risk assessment indicates there is no reasonable likelihood of harm occurring then individuals exposed to carcinogens at work should be included in a suitable health surveillance programme. The form of health surveillance will depend on the type of adverse health effect that is anticipated. Some occupational cancers, e.g. skin cancer, may be readily detectable by acceptable means, e.g. suitable skin inspection by a competent individual, at a stage where effective treatment is possible.

In all cases where a worker is to be exposed to carcinogens at work, initial pre-employment/pre-exposure questionnaire assessment should be ensured as a minimum. A health record should be retained together with the MSDS and the COSHH risk assessment for the work to be carried out. Individual employees should receive information on the health risks, control measures, and in relation to any early warning signs or symptoms that they should report for further medical assessment. Further periodic health surveillance assessments may be undertaken at suitable intervals. In some cases it might be appropriate to continue health surveillance even though exposure has ceased and an individual has left employment.

A sample health surveillance questionnaire/form for recording the outcome of health surveillance is included at Annex F2.

ANNEX F2

SAMPLE HEALTH SURVEILLANCE FORM FOR CARCINOGEN WORKERS

Do you have any hobbies?	Yes ☐	No ☐	Please detail:	

Section A4 – Medication and Allergies

Are you taking any medication?	Yes ☐	No ☐	
What medication are you taking?			
Do you have any allergies?	Yes ☐	No ☐	
Please describe:			

Section A5 – Family History

Are there any illnesses or health problems that run in your family?	Yes ☐	No ☐
If YES, please give details including relationship to you of affected individual.		

Section A6 – Your Health Details

How would you rate your present health?	Excellent ☐	Very Good ☐	Good ☐	
	Fair ☐	Poor ☐		
Height	m/ft in	Weight	kg/st lb	
How long ago did you have a fitness for work assessment?	3 months ☐	6 months ☐	12 months ☐	2 years ☐
	3 years ☐	4 years ☐	5 + years ☐	Never ☐

Exposure and Absence History

Section B1

Previous Employment Details (please add extra sheets if sufficient space is not available)

Please list your employment details in reverse chronological order, starting with your previous employment.

Dates		Company	Job Description
From	To		

Personal Details:
Please answer all the following questions by filling in the shaded areas.
(Please use block capitals).

Section A1

Pre-employment:	Yes ☐	No ☐	or						
Reason for Assessment:									
BP Staff:	Yes ☐	No ☐							
Employee ID:		or	Social Security No:		or	Government ID:			
Country:				Segment:					
Business Unit (BU):				Team:					
Job Title:									
Line Manager:									
Surname:									
First Name(s):									
Title:	Mr ☐	Mrs ☐	Miss ☐	Ms ☐	Other (Please state)				
Previous/Maiden Name(s):									
Date of Birth (Day/Month/Year):	/ /								
Gender:	Male ☐	Female ☐							
Email:				Contact Tel No(s):					
Home Address:									
Post Code:				Telephone:					

Section A2 – Personal Physician Details

GP's Name:	
Address:	
Tel No:	
Email:	

Section A3 – Social History

Do you smoke?	Yes ☐	No ☐			
Have you ever smoked?	Yes ☐	No ☐			
How long since you stopped?	Years		Months		
Do you drink alcohol?	Yes ☐	No ☐			

How many units per week?	Number		1 unit of alcohol = 250ml ordinary beer/lager/cider 3.5% alcohol 1 unit of alcohol = 125ml wine (1 small glass) 11% alcohol 1 unit of alcohol = 25ml spirit 40% alcohol

Section B2

During the past two years how many times have you taken sick leave from work or training/education?			
Approximately how many days in total does this add up to?			
What were the reasons for the absence?			
Have you ever left a job or training on the grounds of ill health or had a job modified for health reasons?	Yes ☐	No ☐	
If Yes, for what reason:			

Section B3 – Please tick if you have ever worked with, or been exposed to, any of the following:

Asbestos	☐	Mercury	☐
Ionising radiation	☐	Noise	☐
Any chemical known to cause cancer	☐	Oil or oil products	☐
Benzene	☐	Lead	☐
Cadmium	☐	Mercury	☐
Any substance known to be an irritant or sensitiser	☐	Vibration	☐

Section C – Current Work

Briefly please describe your job. What do you work with and what do you do?
Please detail ill health, or changes in health, since your last assessment.

Section L – Cardiovascular: Heart and Blood

Have You Ever	YES	NO	Details, Including Dates
Had varicose veins or Deep Vein Thrombosis (DVT) or blood clots?	☐	☐	
Had anaemia?	☐	☐	
Been told you have any other blood disorder?	☐	☐	

Section N – Genitourinary

Had kidney problems?	☐	☐	
Had kidney stones?	☐	☐	
Had bladder stones?	☐	☐	
Had any other problem with your bladder?	☐	☐	

If you are a woman please answer the following questions, if you are a man please go to the next section.

Section O1 – Health Details (Women Only)

Have you ever had gynaecological problems requiring hospital admission, referral to outpatients or needing regular treatment from your General Practitioner? (Please state condition and dates)	☐	☐	
Have you ever had significant breast problems?	☐	☐	
Are you pregnant at the moment?	☐	☐	
If yes when is your due date? (This information is required to ensure that you are not asked to perform any task that is not appropriate in pregnancy).	☐	☐	
Are you currently breast-feeding?	☐	☐	

If you are a man please answer the following question:

Section O2 – Health Details (Men Only)

Had prostatic cancer or cancer of your testicles or scrotum?	☐	☐	

Section Q – Other Health Problems

Have you had cancer, immunosuppression, or any other significant health problem or operation not mentioned previously?	☐	☐	

Name of Examining Health Professional: (Printed) .....

Signed: .....

Date:

ANNEX G BENZENE

CONTENTS

ANNEX G1
BENZENE — GUIDANCE ON HEALTH SURVEILLANCE

G1.1 INTRODUCTION

Benzene is a highly flammable liquid which occurs naturally in crude oil, natural gas and in some ground waters. It is also manufactured from crude oil and is present in crude oil vapours. Benzene evaporates easily, and most people can just detect its distinctive smell at concentrations between 2,5 and 5 parts per million (ppm) in air.

Benzene can be absorbed into the body by inhalation, ingestion and adsorption through skin.*

The effects on health depend on how much exposure there is to benzene, and for how long. Acute effects with very high exposures (e.g. 7 500 ppm) include: headache, tiredness, nausea, dizziness, narcosis and loss of consciousness. Long-term exposure to benzene can result in depression of the bone marrow and an increased risk of aplastic anaemia and leukaemia. Effects on the nervous system with chronic benzene poisoning include behavioural and psychomotor changes, and vestibular, labyrinthine and acoustic impairment.

*Note on PPE: Gloves should be made from materials which resist penetration by benzene. Natural rubber gloves should not be worn as rubber absorbs benzene.

G1.2 HEALTH SURVEILLANCE

Occupational hygiene exposure assessment and monitoring should provide information on how potential exposure is managed. Urinary biological monitoring for benzene metabolites forms a useful part of the overall exposure assessment. Biological monitoring can also be used to assess the degree of any inadvertent or accidental exposure to benzene. S-phenylmercapturic acid (S-PMA) is a specific metabolite of benzene which is excreted in the urine. This metabolite can be used to indirectly determine benzene exposure. An exposure to benzene of 1 ppm (8 hour TWA) would give a urinary S-PMA/creatinine ratio of approximately 21 µmol/mol. Cigarette smokers will have higher baseline metabolite levels due to the benzene content in tobacco smoke. For those job positions where the occupational hygienist's exposure assessment indicates the need for health surveillance, a benzene-specific questionnaire should be completed and an annual full blood count (FBC) should be considered. There is limited value in performing health surveillance when exposure levels are below 1 ppm (8 hour TWA).

G1.3 HOW TO PERFORM THE HEALTH SURVEILLANCE

Components of the examination:

— Benzene questionnaire, and

— Full blood count.

Pre-exposure or baseline assessment:

— There should be no history of blood disorders.

— All measurements in the full blood count must be within normal parameters.

— Abnormal results should be reviewed by an occupational physician.

Annual health surveillance:

— Any change in medical history requires further investigation especially if there is evidence to suggest a haematological problem.

— All measurements in the full blood count must be within normal parameters and referred to the occupational physician if there is any discrepancy.

— A change in the haemoglobin >1 g/dl from the previous test must be referred to the occupational physician for further review.

G1.3.1 How to biologically monitor for benzene

When biological monitoring is used as part of the exposure assessment, a baseline or pre-exposure urine sample should be collected. When the sample is being collected due to an inadvertent exposure to benzene, it will only be possible to collect a single, post-exposure sample. For post-exposure sample collection, timing is important: the sample needs to be taken approximately four to six hours following the exposure. It takes time for the benzene to pass through the body and taking it before this time period will not provide an accurate result.

— Ask the individual to provide a sample of urine in the designated container.

— Use the sample vial provided by the testing laboratory.

— 5 mls of fresh urine is transferred to a sample preparation vial. Secure lid and mix by inversion.

— Complete the name, date of birth, time and date on the vials and refrigerate. Complete necessary paperwork.

— Send to testing laboratory.

G1.3.1.1 Results of inadvertent exposure

The S-PMA urinary result should be reviewed by an occupational physician. If result indicates a benzene exposure >1 ppm, the following should be considered:

— Invite donor in for counselling.

— Offer full blood count.

— Record all actions.

— Repeat full blood count after three months.

— Complete record of actions and file in medical record.

— If benzene poisoning is confirmed by an occupational physician, the case may need to be reported depending upon country regulations e.g. RIDDOR in United Kingdom.

ANNEX G2

SAMPLE BENZENE QUESTIONNAIRE

BENZENE QUESTIONNAIRE **CONFIDENTIAL**

DEMOGRAPHICS

Print Name: Surname	First	D.O.B.

CURRENT STATUS

1.	YES	NO		YES	NO
a. Have you ever had exposure to Benzene in an incident at work? If 'Yes', were you wearing the appropriate PPE?			c. Have you ever had exposure to Pesticides?		
b. Have you ever had exposure to Radiation? (other than X-rays in a doctor's office)			d. Have you ever had exposure to Nitrites (TNT)?		

If 'Yes' to any of the above questions, how much exposure did you have and when did it occur?

.....

2. Have you or any members of your family had any of the following conditions?

	YES	NO		YES	NO
a. Leucopenia (low white cell count)			e. Anaemia (low blood, low red cell count, iron or sickle cell anaemia		
b. Haemophilia (abnormal blood clotting)			f. Leukaemia or Lymphoma (cancer of the blood or lymph glands)		
c. Thrombocytopenia (low platelet count)			g. Pancytopenia (low red cell, white cell, platelets count)		
d. Any other form of cancer					

If 'Yes' to any of the above, please list the dates of illness and the treatment received, if any:

.....

.....

3. Please list all prescription and non-prescription medications that you have taken in the last 30 days:

.....

.....

4. Have you had any disease or disorder of the kidneys or liver? Yes ☐ No ☐
If 'Yes' please give date of illness and describe:

.....

.....

5. Have you had any disease or disorder of the heart or lungs? Yes ☐ No ☐
If 'Yes', please give date of illness and describe:

.....

.....

6. Have you had any of the following symptoms in the last 30 days?

	YES	NO		YES	NO
a. Dizziness			d. Frequent or easy bruising		
b. Excessive fatigue			e. Rapid heart rate with normal activities		
c. Bleeding from the gums or inside the nose			f. Shortness of breath with normal activities		

If 'Yes' to any of the above, please indicate when the problem started and whether you have seen a doctor for it:

.....

7. Are there any other medical problems that you would like to discuss ? Yes ☐ No ☐

I certify that the responses to these questions are true and complete to the best of my knowledge.

Signature: Date:

MEDICAL USE ONLY

Comments:

Full blood count result normal? Yes ☐ No ☐

Refer to occupational physician? Yes ☐ No ☐

Medic/Nurse Name:

Signature: Date:

ANNEX H
MERCURY

H.1 INTRODUCTION

Mercury is a metal that is poisonous in all its forms. It is found naturally in crude oils and can pose a significant health hazard if adequate control measures are not in place.

There are three important types of mercury, each of which poses a different health hazard. Elemental mercury is a liquid which can be absorbed through the skin and into the blood stream and the vapour can be inhaled through the lungs if swallowed; however, this form of mercury is not absorbed out of the stomach and usually passes out of the body without harm.

Inorganic mercury compounds (e.g. mercuric chloride) can also be inhaled and absorbed through the lungs, and may pass through the skin. The compounds can also be absorbed through the stomach if swallowed. Many inorganic mercury compounds are irritating or corrosive to the skin, eyes and mucus membranes.

Organic mercury compounds (e.g. phenyl mercuric propionate) can enter the body readily through all three routes i.e. lungs, skin and stomach.

H.1.1 Acute health effects

Very high exposures to mercury vapour in the air can cause acute poisoning. Symptoms usually begin with cough, chest tightness, difficulty breathing and upset stomach. This may go on to pneumonia, which can be fatal. If the inorganic mercury compounds are swallowed, nausea, vomiting, diarrhoea and severe kidney damage can occur.

H.1.2 Chronic health effects

Exposure to any form of mercury on a repeated basis, or even from a single, very high exposure can lead to the disease of chronic mercury poisoning. There are three main symptoms: Gum problems – the gums become soft and spongy, the teeth get loose, sores may develop, and there may be increased saliva; Mood and mental changes – people with chronic mercury poisoning often have wide swings of mood, becoming irritable, frightened, depressed or excited very quickly for no apparent reason. Such people may become extremely upset at any criticism, lose all self-confidence and become apathetic. Hallucinations, memory loss and inability to concentrate can occur; Nervous system – the earliest and most frequent symptom is a fine tremor of the hand. A tremor may also occur in the tongue and eyelids. Eventually this can progress to trouble balancing and walking.

H.2 HEALTH SURVEILLANCE

Health surveillance shall be conducted for any employees who are exposed to significant levels of mercury or its compounds. Health surveillance takes the form of a discussion and clinical examination which shall be performed as a baseline and periodically.

There are two tests available to measure mercury in the body:

— Blood mercury test measures exposure to all three types of mercury, but because mercury remains in the bloodstream for only a few days after exposure, the test must be done soon after exposure. Most non-exposed people have mercury levels of 0 to 2 ug/dl. This test can be influenced by eating fish, as fish (particularly certain deep sea fish) may contain mercury.

— Urine mercury test only measures exposure to elemental and inorganic mercury. Organic mercury is not passed out the body in the urine and thus cannot be measured this way. Urine is tested randomly throughout a shift measuring umol mercury/mol creatinine in urine. A person with no exposure to mercury would probably have a urine mercury level of 0 to 20 ug/L.

H.3 HOW TO PERFORM HEALTH SURVEILLANCE

H.3.1 Programme participation

Personnel meeting the following criteria are to be enrolled in a mercury health surveillance programme:

— 8-hour TWA exposures above the HSE EH40/2003 (or ACGIH) exposure limit of 0.025 mg/m³.

— Upon notification by an employee that they have developed signs and symptoms commonly associated with toxic exposure to mercury and its associated compounds.

H.3.2 Examinations

Exams shall include a complete medical history and physical exam, blood count and routine urinalysis. Participants in the health surveillance programme shall be apprised of all agents in the work environment known or suspected to present a risk for reproduction or development. Exams also should include a history and other findings consistent with diseases of the eye, skin, respiratory system, and kidneys. In addition, the presence of any pre-existing neurological disorders should be carefully recorded and a very thorough neurological examination performed.

H.3.2.1 Pre-placement, periodic, and end of duty exams

— Pre-placement exam: All personnel subject to exposure to mercury vapour or dust of its inorganic and associated compounds should undergo comprehensive medical examination at the beginning of employment.

— Periodic exam: Annually for personnel enrolled in the surveillance programme.

— End of duty exam: The medical, environmental, and occupational history interviews, physical examination, and the selected physiological and laboratory tests that were conducted at time of placement should be repeated at the time of job transfer, end of duty or termination to determine the employee's medical status.

H.3.2.2 Biological monitoring requirements

— Urine sampling should be used to measure the total, ionic and elemental mercury in urine of potentially exposed employees.

— Personnel who have 8-hour TWA exposures above the EH40/2003 exposure limit (0,025 mg/m³) should undergo biological monitoring every six months.

— Personnel whose urinary mercury result is greater than or equal to the HSE Biological Monitoring Guidance Value (BMGV) of 20 micromoles of mercury per mole (µmol/mol) of creatinine, should have the test repeated within two weeks of receiving the initial test results.

H.3.2.3 Emergency exposure biological monitoring requirements

For the purposes of health surveillance an emergency exposure is considered the following:

— A single 8-hour TWA exposure that is four times above the exposure limit of 25 µg/m³, (100 µg/m³) without the use of respiratory protection.

Blood samples shall be used to measure total, ionic and elemental mercury per ACGIH Biological Exposure Indices (BEI) requirements for all personnel that have exposures equal to or exceeding these levels.

— Blood sample results are to be compared to the current ACGIH BEI of 15 µg/g.

— Testing shall be completed within two weeks of the emergency exposure.

H.4 MEDICAL REMOVAL PROVISIONS

If a repeat urine sample test remains >20 µmol/mol the employee should not be permitted to work on tasks that involve exposure to mercury until their urine mercury level decreases to below acceptable limits.

— Repeat urine test every 30-60 days to track progress.

— The employee's job and work practices shall be examined, and other exposure sources of mercury should be investigated.

H.4.1 Emergency exposure provisions

Personnel with blood test results >15 µg/g mercury after an emergency exposure shall be removed from the work environment and not be permitted to work on tasks that involve exposure to mercury until they are medically cleared to return to their normal work duties.

ANNEX J
ASBESTOS

J.1 INTRODUCTION

The name asbestos refers to a group of naturally-occurring, fibrous, crystalline silicates. All types of asbestos occur as long fibrous crystals which split longitudinally (i.e. along the length of the fibre to form progressively thinner fibres). Asbestos became increasingly popular among manufacturers and builders in the late 19th century due to its resistance to heat, electricity and chemical damage, its sound absorption and tensile strength. When asbestos is used for its resistance to fire or heat, the fibres are often mixed with cement or woven into fabric or mats. Asbestos was used as thermal lagging for its heat resistance, and in buildings for its flame-retardant and insulating properties, tensile strength, flexibility, and resistance to chemicals.

Asbestos is highly toxic, and the physical structure of asbestos enables it to break up into small fibres which are capable of remaining suspended in the air for long periods. These fibres may be inhaled and some may penetrate to and be deposited in the lungs. The inhalation of asbestos fibres can cause serious illnesses, including mesothelioma and asbestosis. Since the mid-1980s, the manufacture and use of asbestos-containing materials (ACMs) has been banned in many countries. Asbestos exposure has resulted in the highest work-related deaths in the UK. Asbestos fibres (asbestos dust) may be emitted into the workplace environment during the manufacture, use, machining (cutting, drilling, etc.), removal and disposal of ACMs or products, and due to deterioration in the condition of asbestos-containing materials *insitu*. Building maintenance workers (plumbers, electricians, etc.) are thought to be particularly at risk as a consequence of the extensive use of asbestos in older buildings.

Work with asbestos in the UK is subject to the *Control of Asbestos at Work Regulations 2006 (L143)*. When work with ACMs or which may disturb ACMs is being carried out, where exposure of employees to asbestos is sporadic and of low intensity, the Asbestos Regulations require employers and the self-employed to prevent exposure to asbestos fibres by the prescribed means and to ensure that full risk assessment and plan of work etc. are compiled for the work. In addition, for major work with asbestos a licence needs to be applied for, and the detailed requirements stipulated in the Asbestos Regulations strictly adhered to. Where this is not reasonably practicable, they must make sure that exposure is kept as low as reasonably practicable by measures other than the use of respiratory protective equipment. The spread of asbestos must be prevented. The Regulations specify the work methods and controls that should be used to prevent exposure and spread.

Worker exposure must be below the airborne exposure limit (control limit). The Asbestos Regulations have a single control limit for all types of asbestos of 0,1 fibres per

cm^3. A control limit is a maximum concentration of asbestos fibres in the air (averaged over any continuous four-hour period) that must not be exceeded.

In addition, short term exposures must be strictly controlled and worker exposure should not exceed the Peak Level of 0,6 fibres per cm^3 of air averaged over any continuous 10-minute period, using respiratory protective equipment if exposure cannot be reduced by any other means.

J.1.1 Health effects

Inhalation is the usual route of exposure to asbestos fibres. The most common changes that asbestos exposure may cause, depending on the total doses received, are:

— pleural plaques;

— pleural thickening;

— asbestosis;

— lung cancer, and/or

— mesothelioma of the pleura and peritoneum.

Asbestos-related diseases are of insidious onset and generally appear many years after first exposure.

J.2 HEALTH SURVEILLANCE

Employees who are subject to health surveillance under the HSE Control of Asbestos at Work Regulations 2006 must undergo health surveillance conducted by doctors specifically appointed by the HSE Employment Medical Advisory Service (EMAS).

Health surveillance shall consist of initial and periodic medical examinations as described in HSE Guidance Note MS13: *Asbestos medical guidance*. Health surveillance specifically provides the opportunity to warn employees of the increased risk of lung cancer from the combined exposure of smoking and asbestos.

Following examination the doctor must issue both the employer and employee with an original 'certificate of medical examination'. Employers must keep the certificate or a copy for at least 40 years from the date it was issued.

Asbestosis, lung cancer and mesothelioma in employees exposed to asbestos are notifiable diseases under the RIDDOR 1995.

J.3 POST-SURVEILLANCE ACTION

The HSE appointed occupational doctor is responsible for providing individual fitness advice and passing anonymised grouped results to the employer's Occupational Health department. These data can be used by companies as a basis to assess the adequacy of risk controls.

Individuals with pleural thickening, asbestosis, lung cancer or mesothelioma may be able to claim industrial injuries disablement benefit. They should seek guidance from the Department of Work and Pensions (DWP).

ANNEX K
LEAD

K.1 INTRODUCTION

Work with lead is subject to the Control of Lead at Work (CLAW) Regulations 2002. Employers must not carry out work which is liable to expose any employees to lead unless they have first carried out a risk assessment in accordance with the regulations. The HSE has published an *Approved Code of Practice, L132*, to assist compliance with the CLAW regulations.

Lead can enter the body from inhaling and ingesting dust and chemicals that contain lead. Where exposure to lead is liable to be significant then health surveillance will be mandated. An example from the energy industry of an exposure that would be liable to be significant would be work to remove lead paint by blasting or burning.

K.1.1 Health effects

Lead exposure can affect almost every system within the body including the brain; blood; kidneys; and cardiovascular, central nervous and reproductive systems. Symptoms of exposure to lead include, but are not limited to:

— abdominal pain;
— constipation;
— diarrhoea;
— brain damage;
— central nervous system disorders;
— irritability;
— fatigue;
— dizziness;
— headache;
— poor appetite;
— weakness;
— fine tremors;
— insomnia;
— 'lead line' along gums;
— muscle/joint pain, and/or
— metallic taste in mouth.

The unborn child and the young are particularly susceptible to harmful effects from lead and for this reason the regulations include special provisions relating to women of reproductive capacity, pregnant women, and young persons (ages 16 and 17).

K.2 HEALTH SURVEILLANCE

Employees who are subject to surveillance under the CLAW regulations must undergo health surveillance conducted by doctors specifically appointed by the HSE Employment medical advisory service. Health surveillance must commence 'so far as is reasonably practicable… before an employee for the first time commences work giving rise to exposure to lead and in any event within 14 working days'. Health surveillance includes physical examination at least annually, as well as periodic biological monitoring (blood lead +/- (lead alkyls only) urinary lead) and biological effects monitoring (ZPP) depending on age, sex and previous biological monitoring results. Prescribed actions, including possible suspension from work involving exposure to lead, may be required depending on the results of testing performed.

The HSE appointed doctor is responsible for providing individual fitness advice and passing anonymised grouped results to the employer. These data can be used by relevant business units as a basis to assess the adequacy of risk controls.

A detailed description of the procedures for the medical surveillance of lead workers, including sample forms, is included in the relevant HSE ACOP.

ANNEX L
IONISING RADIATION

L.1 INTRODUCTION

Management of the health of ionising radiation workers is a complex and highly regulated system. Only specially appointed doctors and employment medical advisers are authorised to conduct health surveillance of such workers and they will have received training and formal instruction on exactly how this should be performed and on how to deal with cases of over-exposure. The following is intended as a brief overview and summary for the general occupational physician and is in no way intended to provide guidance to appointed doctors or to be taken as sufficient information in itself.

L.2 HEALTH SURVEILLANCE

Under the UK Ionising Radiation Regulations 1999 (IRR99) employers in work in which exposure to ionising radiation may occur have a duty to put in place health surveillance for certain workers, principally to ensure their fitness to start work or continue work with ionising radiation.

L.2.1 Affected workers

Two main groups of worker are affected:

— Anyone whom the employer decides warrants designation as a 'classified person' under Regulation 20 of the IRR99 (see L.6).

— Any worker, classified or not, who has received an over-exposure of ionising radiation.

Note: Classified person: an employer will identify an employee as a classified person if that employee is likely to be exposed to an effective dose of >6 mSv per year or an equivalent dose which exceeds three tenths (3/10) of any relevant dose limit. Also, any employee who works with a source that could give rise to an acute exposure of >20 mSV or in excess of any relevant limit within a few minutes should be deemed a classified person. No one can be classified until an AD or EMA has indicated that he is fit to work with ionising radiation. Persons under 18 years cannot be classified persons.

L.2.2 Doctors competent to perform health surveillance

Health surveillance for ionising radiation workers must be performed by either an 'appointed doctor' (AD) or an employment medical adviser (EMA) (see L.3).

L.2.3 Objective of surveillance

— Fitness to wear any personal protective equipment (including respiratory protective equipment) required to restrict exposure.

— Fitness of an employee with a skin disease to undertake work with unsealed sources. The concern is that damaged skin may permit ingress of radioactive material or provide a reduced barrier to external radiation.

— Fitness of individuals with serious psychological disorders to undertake work with radiation sources where there is a particularly high level of responsibility and risk. The concern is that such an individual may behave irresponsibly or recklessly, endangering himself or others through his access to ionising radiation or materials.

— Fitness of individuals who, thought normally at low risk of exposure, might be exposed to very high doses in the event of an accident. While a risk assessment may indicate that routine risk of exposure is very low, account should be taken of the risk of occasional very high exposure through accident.

— Fitness of individuals who have been over-exposed.

L.2.4 Frequency of surveillance

— A classified person must have a certification of fitness to work with ionising radiation before commencing such work. Certification within the preceding 12 months will normally be acceptable.

— Thereafter, health surveillance shall be annually (between 11 and 13 months following last surveillance) at a minimum, and may be more frequent at the discretion of the appointed doctor or EMA.

— Surveillance of a worker who has been over-exposed will be at a frequency decided by the appointed doctor or EMA.

L.3 HOW TO PERFORM THE HEALTH SURVEILLANCE

The exact nature of the surveillance is at the discretion of the appointed doctor or EMA based on the particular circumstances, and in accordance with the guidance issued to appointed doctors and EMAs by the HSE at the time. Typical elements may include:

— Dose profile.

— Sickness absence record.

— Occasionally other records – e.g. monitoring reports.

— Interview with employee – at doctor's discretion.

— Medical examination of employee–at doctor's discretion.

— Counselling and possible exposure restrictions for over-exposed employees.

— Special tests, e.g. chromosome aberration analysis for over-exposed employees, at discretion of doctor.

— Special restriction on external doses to the abdomen (not >13 mSv in any consecutive three-month period for women of reproductive capacity).

L.3.1 Health record

A health record detailing the health surveillance findings (but not confidential medical information) should be completed on each occasion by the AD or EMA and kept by the employer. Such a health record should be kept until the individual has reached or would have reached (in the case of earlier death) the age of 75, or in any event, for at least 50 years after the last entry in the record. The Data Protection Act 1998 applies to such health surveillance records. The employer must ensure, for certified workers undergoing annual surveillance, that an AD or EMA makes a valid entry regarding fitness in the health surveillance record at intervals not less than 11 months and not more than 13 months.

L.4 OTHER EMPLOYER DUTIES

The employer must:

— Permit the AD or EMA to inspect the workplace upon request.

— Allow designated or over-exposed workers to attend for health surveillance at the appropriate period and in work time.

— Make suitable premises available to the AD or EMA to conduct health surveillance or allow employees to attend the doctor's normal place of practice.

— Make available to the AD or EMA dose exposure record, sickness absence record as a routine.

— Make available to the AD or EMA any other record which the doctor might reasonably ask for in relation to the surveillance, given a reasonable period of notice.

L.4.1 Pregnant and breast-feeding employees

— Employees of child-bearing age should be aware of the need to inform their employer in writing if they become pregnant.

— The employer should ensure that exposure is reduced such that exposure to the foetus is likely to be less than the equivalent of 1 mSv for the remainder of the pregnancy. For exposure to external radiation, this may be taken to be roughly equivalent to an exposure of 2 mSv to the abdomen.

— Exposure and working conditions may need to be modified when an employee is breast-feeding.

— Exposure control during pregnancy and breast-feeding is potentially complex and advice from the AD or EMA is essential.

L.5 ACTIONS FOLLOWING HEALTH SURVEIILLANCE

L.5.1 Employees certified unfit or fit subject to conditions

— Where an AD or EMA has indicated in the health record that an employee is not fit to undertake work with ionising radiation, the employer should ensure that the employee does not do so.

— Where an AD or EMA has indicated that the employee may only work under certain conditions (e.g. reduced dose exposure) then the employer must ensure that the employee does not work except under those conditions.

— Conditions or restrictions specified in the health record will remain in place until they are rescinded or modified by an AD or EMA.

— An employee may seek a review of any decision made by the AD or EMA in the health record.

ANNEX M HIGH TEMPERATURE WORKING

CONTENTS

ANNEX M1
HEALTH SURVEILLANCE FOR HIGH TEMPERATURE WORKING

M1.1 INTRODUCTION

Heat stress can be described as the additional load on bodily functions caused by the need to maintain a normal body temperature.

Heat stress disorders occur when the body's means of controlling its internal temperature starts to fail. This will be due to factors such as air temperature, work rate, humidity and clothing.

The body reacts to heat by increasing the blood flow to the skin's surface, and by sweating. This results in cooling as sweat evaporates from the body's surface and heat is carried to the surface of the body from within by the increased blood flow.

Work involving exposure of personnel to high temperatures should be avoided whenever possible. This is because the adverse effect of heat on humans is often unpredictable and rapid in onset, with potentially very serious consequences. Major factors to be taken into account in the risk assessment are:

— Work rate – the harder someone works, the greater the amount of body heat generated.

— Working climate – this includes air , surface temperature and radiant temperatures, humidity, air movement and effects of working near a heat source.

— Worker clothing and personal protective equipment.

— Worker's age, build, general fitness and medical factors such as heart disease and medication.

— Acclimatisation – the opportunity for the worker to naturally accommodate and acclimatise to the heat exposure over a period of time.

M1.1.1 Health effects

There are a number of problems which may occur due to heat. These include transient heat fatigue, heat syncope, heat cramp, and heat hyperpyrexia or heat stroke.

M1.1.1.1 Transient heat fatigue

Transient heat fatigue is a heat-related effect that is more a behavioural than a physiological response to working in heat. The work performance of the employee declines especially where the task requires co-ordination, alertness or vigilance. Generally these employees are not acclimatised. This results in an increased risk of accidents.

M1.1.1.2 Heat syncope

This is a heat-related condition where blood, which would normally be circulated to the heart and brain, tends to pool in the leg veins, thereby causing fainting. The veins lack tone when initially exposed to hot climates.

M1.1.1.3 Heat cramp

Heat cramp occurs after prolonged vigorous exercise especially in hot climates. There is a sudden onset of pain and cramps in the extremities. There may be nausea and hypotension and in some cases hyperventilation.

M1.1.1.4 Heat exhaustion

Heat exhaustion is a progression from heat cramp and it is a more severe condition. It is more likely in the dehydrated, unfit, the elderly and those who have high blood pressure. It is caused by both salt and water loss. Symptoms and signs include headache, fatigue, dizziness, confusion, nausea and abdominal cramps. There may be syncope and collapse. Profuse sweating and a pale and clammy skin are often observed along with a weak and rapid pulse, hypotension and rapid breathing. The body temperature may be normal or elevated up to 39 °C.

M1.1.1.5 Heat hyperpyrexia or heat stroke

Heat hyperpyrexia or heat stroke is caused by exactly the same conditions as heat exhaustion. It begins as heat exhaustion, but when the body's system for losing heat is overwhelmed, the core temperature rises rapidly and tissue damage occurs. This affects mainly the brain, kidneys and liver as the circulation collapses. Symptoms of heat stroke include headache, dizziness along with a dry mouth. The skin may be hot and flushed and may feel dry, although this is not a universal sign and should not be relied on. The body temperature may be very high, greater than 40 °C. The pulse is strong and bounding initially, but may then collapse. If the condition is not correctly managed, convulsions, coma and death may result.

M1.2 HEALTH SURVEILLANCE

M1.2.1 Pre-exposure assessment

Heat surveillance questionnaires such as the one shown Annex M2, can be used to help assess the suitability of an employee for work in a hot environment/confined space prior to starting such work and at periodic intervals thereafter. If any of the questions are answered 'yes', details should be given in the appropriate column. The answers to the questions should remain confidential. Following assessment by an occupational health adviser, advice on suitability for this type of work will be given to management representatives, without medical details being divulged.

M1.2.2 Health monitoring

If the risk assessment identifies that health monitoring is required, the person in charge should ensure that a medic or nurse is available throughout the time that hot working continues. The purpose of this is essentially two-fold:

1. To carry out health monitoring of individual workers.
2. To provide emergency treatment for a heat stress disorder.

— For health monitoring. pulse rate, using an electronic pulse meter, and aural temperature, using an electronic ear thermometer, should be recorded.

— Personnel will not be permitted to work while the equivalent aural temperature is greater than 37,5 ˚C (this equates to a core temperature of 38 ˚C, and allows at least 0,5 ˚C additional safety margin).

— Consider an upper limit for the first phase recovery pulse rate (exit and rest for three minutes) of 125 beats per minute. In addition, the pulse rate should have fallen to within 10 bpm of the resting rate within 30 minutes of exit.

M1.2.3 Preventing and controlling heat stress

Since measurement of deep body temperature is sometimes impractical for monitoring the worker's heat load, the measurement of environmental factors is required. Environmental heat measurements should be made at, or as close as possible to, the specific work area where the worker is exposed. When a worker is not continuously exposed in a single hot area but moves between two or more areas having different levels of environmental heat, or when the environmental heat varies substantially at a single hot area, environmental heat exposures should be measured for each area and for each level of environmental heat to which employees are exposed. Portable heat stress meters or monitors are used to measure heat conditions.

Ventilation, air-cooling, fans, shielding, and insulation are the five major types of engineering controls used to reduce heat stress in hot work environments. Heat reduction can also be achieved by using power assists and tools that reduce the physical demands placed on a worker.

Acclimatisation to the heat through short exposures followed by longer periods of work in the hot environment can reduce heat stress. New employees and workers returning from an absence of two weeks or more should have five-day period of acclimatisation. This period should begin with 50 % of the normal workload and time exposure the first day and gradually building up to 100 % on the fifth day.

Fluid replacement - Cool (10 °C - 15 °C) water or any cool liquid (except alcoholic beverages) should be made available to workers to encourage them to drink small amounts frequently, e.g. one cup every 20 minutes. Ample supplies of liquids should be placed close to the work area and the workers should be encouraged to salt their food well.

Employee education is vital so that workers are aware of the need to replace fluids and salt lost through sweat and can recognise dehydration, exhaustion, fainting, heat cramps, salt deficiency, heat exhaustion, and heat stroke as heat disorders. Workers should also be informed of the importance of daily weighing before and after work to avoid dehydration.

Alternating work and rest periods with longer rest periods in a cool area can help workers avoid heat stress. If possible, heavy work should be scheduled during the cooler parts of the day and appropriate protective clothing provided. Supervisors should be able to detect early signs of heat stress and should permit workers to interrupt their work if they are extremely uncomfortable.

M1.3 ACTIONS FOLLOWING MONITORING

Individuals should not be allowed to re-enter the hot environment until the core temperature has returned to normal. Individuals who have been withdrawn from the hot environment due to signs/symptoms of heat stress disorder will not be allowed to re-enter for at least 24 hours and must be medically re-assessed before doing so.

ANNEX M2

HEAT SURVEILLANCE QUESTIONNAIRE

Do you suffer or have you suffered from any of the diseases listed below?

	YES	NO	Details, Including Dates
Heart attack/heart surgery	☐	☐	
Angina/other heart disease	☐	☐	
Any current symptoms of illness	☐	☐	
High blood pressure	☐	☐	
Asthma/other lung disorder	☐	☐	
Alcohol problems	☐	☐	
Diabetes	☐	☐	
Epilepsy/blackouts	☐	☐	
Fear of confined spaces	☐	☐	
Kidney stones/other kidney disorders	☐	☐	
Any form of heat illness (Heat cramp, heat exhaustion, heat stroke)	☐	☐	
Back or limb problems	☐	☐	
Any other disease or disorder	☐	☐	
Are you currently taking any regular medication for any disorder?	☐	☐	
Current weekly alcohol intake (units)	☐	☐	
If in doubt about any answers, please ask Occupational Health Staff			

I have read and understood the above questions regarding my physical condition.

I give my consent for Occupational Health Advisers to inform management in general terms about my suitability for hot confined space working, based on my answers to these questions, and any further medical examination deemed appropriate to assess my suitability for these tasks.

I confirm that I do not suffer from any of the conditions listed above, or from any other serious disease.

Signature: **Date:**

Print Name: **DOB:**

Address: **Employer:**

Employee No:

OH use only: **Pulse:**

Height: **Pulse:**

Weight: **BP:**

Opinion: Fit/Unfit for Hot Working **Signature:**

Name:

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