

# Clear Water 2010



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**GUIDANCE ON THE HEALTH HAZARDS OF WORK  
INVOLVING EXPOSURE TO SEWAGE IN THE WATER  
INDUSTRY**

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## FOREWORD

Gastro-enteritis remains a prevalent cause of absence in the water industry. However, as this revised Guidance Note explains, the illness when arising from exposure to sewage is entirely preventable. This requires the same robust management we would expect for all organisational issues.

The Guidance, first published in 1995, has now been revised as part of the Clear Water 2010 programme to further clarify legal requirements and good management practice. Too often in the past, our organisations have not fully taken up opportunities to provide health-focused workplace design nor to sort out poor systems of work, with the result that our responsibilities for health protection have not always been fully met. Gastro-enteritis has remained a frequent and debilitating condition for operators, maintenance personnel and many others, with a consequent unnecessary burden to productivity.

In this revised edition of the Guidance Note, we have for the first time a combined comprehensive toolkit for risk assessment, selection of control measures, *and action*.

The industry is indebted to Pauline Rampling (Northumbrian Water) and her team which prepared this document:

Jane Brown (Anglian Water)  
Mark Dawson (Health & Safety Executive)  
John Needs (Dwr Cymru)  
Alan Laing (Scottish Water)  
Sonja Schwartz (Anglian Water)

Thanks to the rigour of this team, we are now able to reinforce a culture in which gastro-enteritis is not an inevitable part of working in the waste water industry. We can work together towards its complete eradication.

**Rob Gwyther**  
**Clear Water 2010 Programme Manager**  
**December 2006**

## INTRODUCTION

This guidance is aimed at persons that come into contact with sewage including contractors. It may also be of assistance to managers for developing policies and procedures for identifying and controlling risks from sewage. Employee representatives concentrating on employee safety may also find the guidance useful.

The aim of the guidance is to:

- (i) Define the health hazards associated with sewage, and where they occur.
- (ii) Assist with risk assessments and the identification of suitable control measures.
- (iii) Provide guidance on appropriate levels of occupational health surveillance.

The guidance is intended solely to address the *health hazards* of work involving exposure to sewage in the water industry, and does not provide information on the *safety hazards* that may also be encountered. It should be remembered that both health and safety hazards should be considered as part of your overall risk assessment.

This guidance is issued by the Water UK Occupational Health and Safety Group and has been agreed by the Health and Safety Executive. It contains advice on good practice which is not compulsory, but which you may find helpful in considering what you need to do.

## DEFINITIONS

### Sewage

This is defined as material that is likely to find its way into the sewer system. This also includes material stored in intermediate tanks such as cesspits.

The principal constituents are:

- i. **Water** This is the principal constituent of both sewage and sewage sludge. All other substances are considerably diluted in it, which reduces the harm, however it should be appreciated that the water still contains chemicals and bacteria that can still cause harm.
- ii. **Micro-organisms** The major component of solid faecal matter is micro-organisms. These are mainly bacteria and viruses, but can include larger organisms, such as parasites and their eggs.
- iii. **Faecal matter** This includes urine and faeces from both human and animal sources
- iv. **Industrial/agricultural effluent** A large variety of chemicals may be found in industrial effluents that are discharged either routinely,

accidentally or maliciously into sewers.

- v. **Radioactive materials** This may be a problem downstream from hospitals or other industrial sites where radioactive materials are used. Levels are likely to be low. Radon gas may be present in areas where it occurs naturally.
- vi. **Degradation Products / Hazardous gases/vapours** Due to the breakdown of materials within sewage hazardous gases such as hydrogen sulphide, methane may be present. Areas may also suffer from oxygen deficiency as a result of this. Note: where the term 'harmful' is used, substances may also be toxic or cause irritant or sensitising effects.
- vii. **Sewage work bi-products /Screenings** At the sewage treatment works one of the first processes is the removal of floating material by a screening system. These screenings (a.k.a rags) may contain condoms, sanitary towels, and discarded hypodermic needles and syringes, all of which can carry micro-organisms and viruses.
- viii. **Sewage sludge** This is the term used for the solid component of sewage separated from the liquid. The sludge comes from both the primary and secondary settlement tanks. It contains about 5% dry solids.
- ix. **Sewage cake** This is solid material dewatered to approximately 30%w/w dried solids.
- x. **Secondary treated material** This is sludge that has been subjected to a digestion process.
- xi. **Final effluent water** Water that has had adequate treatment to allow it to be discharged into watercourses.
- xii. **Advanced treatment** This is material (includes dried sludge) which has had substantial reduction in micro-biological activity by processes such as drying, lime stabilisation, micro-filtration or ultra-violet treatment.

## HEALTH HAZARDS

Health effects associated with exposure to sewage are related to three groups of disease:

- Infections caused by bacteria, parasites or viruses.
- Allergies caused by proteins in microorganisms that are foreign to the human body and may cause allergic reactions.
- Poisoning or harmful effects caused by harmful gases or chemicals that may be present when working with sewage.

Conditions associated with exposure to sewage are:

- Gastroenteritis
- Skin Infections

- Tetanus and Polio
- Hepatitis
- Eye Infections
- Weil's disease
- Respiratory Illness

Entry into the body:

- Ingestion either directly or Hand to Mouth
- Via broken damaged skin, open wounds
- Via the conjunctiva of the eye
- Through Inhalation
- Injection

### **Conditions**

This is not an exhaustive list, and it is recommended that if there is any concern, or another condition is suspected then medical advice should be sought.

### **1. Gastroenteritis**

Gastroenteritis is a condition characterised by cramping stomach pains, diarrhoea and vomiting. It can be caused by a number of different microorganisms that may be present in sewage.

Route of Entry: Ingestion, Inhalation

#### **CAUSE**

Many cases of Gastroenteritis are caused due to poor hygiene and bad practises whilst working with sewage.

#### **PREVENTION of INFECTION**

The primary method of protection from gastroenteritis is to minimise the risk of exposure to sewage i.e. through workplace design and appropriate work practices.

The most important work practice is that of good hygiene. (See section on Personal Hygiene). Employees should receive training and education on good hygiene practices and made aware of the risks. Employers should encourage their employees to follow this guidance and make suitable facilities available.

#### **HEALTH SURVEILLANCE**

Health surveillance is not required for this condition although employers should monitor employee sickness absence. Employees should be made aware of the importance of reporting this condition to their employer, who should then investigate with a view to establishing whether or not the illness might be occupationally caused.

## **2. Skin Infections**

Some organisms can infect open wounds causing local wound infection. These infections are usually of a minor nature, but infection can spread through the tissues and cause more serious illnesses.

### **Route of Entry**

Any broken or damaged skin, or skin which has been punctured by anything sharp.

### **CAUSE**

Wound infections may occur when either an employee has not covered an existing injury or open damaged skin with a waterproof dressing or has suffered an injury at work that has not been treated in accordance to first aid recommendations.

### **PREVENTION**

The primary method of protection from skin infections is to minimise the risk of exposure to sewage i.e. through workplace design and appropriate work practices such as covering wounds.

The most important work practice is that of good hygiene, the provision and use of suitable personal protective equipment and appropriate first aid measures. Employees should receive training and education on good hygiene practices, location of first aid equipment and be made aware of the risks. Employers should encourage their employees to follow this guidance and make suitable facilities available.

### **HEALTH SURVEILLANCE**

Health surveillance is not required for this condition although employers should monitor site accident books and employee sickness absence. Employees should be made aware of the importance of reporting this condition to their employer, who should then investigate with a view to establishing whether or not the illness might be occupationally caused.

## **3. Eye Infections**

Infection of the eye, or surrounding tissue.

### **Route of Entry**

Either directly or through transmission from hands (e.g.: rubbing eyes)

### **CAUSE**

Eye infection may occur as a result of either direct splashes of sewage to the face or by indirect contamination from hands.

## PREVENTION

The primary method of protection for eye infections is to minimise the risk of exposure to sewage i.e. through workplace design and appropriate work practices.

The most important work practice is that of good hygiene, the provision of suitable personal protective equipment and appropriate first aid measures. Employees should receive training and education on good hygiene practices, location of first aid equipment and is made aware of all risks. Employers should encourage their employees to follow this guidance and make sure suitable facilities and equipment are available.

## HEALTH SURVEILLANCE

Health surveillance is not required for this condition although employers should monitor site accident books and employee sickness absence. Employees should be made aware of the importance of reporting this condition to their employer, who should then investigate with a view to establishing whether or not the illness might be occupationally caused.

## **4. Tetanus, Polio, Hepatitis A, Hepatitis B, Hepatitis C**

The above conditions and a number of other conditions may be associated with contact with sewage but current advice and research suggests that these can be controlled by good hygiene.

For further information see Appendix I on Immunisation.

## **5. Respiratory Illness**

It is suggested by HSE guidance<sup>24</sup> that the inhalation of microorganisms within aerosols or dust may result in occupational asthma, which is characterised by attacks of breathlessness or wheezing and tends to improve when the sufferer is away from work. It is more likely however that any effect on lungs will be as a result of irritants leading to respiratory symptoms.

Route of entry: Through inhalation of fine mists and aerosols or dust from dried sludge. There are also risks from inhalation of harmful gases present or from oxygen deficiency.

### CAUSE:

- Although microorganisms are killed rapidly when they become airborne, those who work where there is visible sewage mist, aerosol or dust may be at risk of developing respiratory illness through inhalation.
- Inhalation of chemical gases or vapours may also result in a risk of developing respiratory illness. Since sewage workers cannot possibly be aware of all the potential chemical exposures resulting from accidental discharges, they may be at higher risk when exposed than other industrial workers with well-defined, continuous exposures.



- Toxic gases, such as hydrogen sulphide and methane may be present when working with sewage. These gases are asphyxiants and at high concentrations are life threatening

#### PREVENTION

The primary method of protection for respiratory illnesses is to minimise the risk of exposure to sewage i.e. through workplace design and appropriate work practices.

The provision of suitable personal protective equipment, including respiratory protection in some cases may be required and appropriate first aid measures. Employees should receive training and education on good hygiene practices, appropriate use of personal protective equipment, and the location of first aid facilities and be made aware of all risks. Employers should encourage their employees to follow this guidance and make sure suitable facilities and equipment are available.

#### HEALTH SURVEILLANCE

Health surveillance is not required for this condition although employers should monitor employee sickness absence. Employees should be made aware of the importance of reporting this condition to their employer, who should then investigate with a view to establishing whether or not the illness might be occupationally caused.

If there is a confirmed case of occupational asthma within the workplace then the provision of health surveillance must be reviewed.

### **6. Weils' Disease (Leptospirosis)**

Weils' Disease is a condition, which can present with flu like symptoms headaches, muscular pain lack of appetite. The disease can lead to Aseptic meningitis, effects on the nervous, renal and respiratory system. It can be fatal.

#### ROUTE of ENTRY

People contract the infection through contaminated fluids, tissues, or waters.

The infection enters through any breaks in the skin (e.g., abrasions, cuts) mucous membranes (e.g., eyes) and possibly intact skin.

#### CAUSE

The most common cause of the spread of this infection is through contact with animal urine either from direct contact or indirect by exposure to infected animal tissue, land, water (including recreational reservoirs) and any surface or product that could have been exposed to direct contact.

#### PREVENTION

To significantly reduce the risk of contacting this infection individuals when working in potential risk areas should maintain high levels of personal

hygiene. Ensuring that hands are properly washed before eating, smoking or rubbing eyes etc.

All open wounds or any breaks in the skin should be covered by a waterproof dressing whilst working in a potential risk area.

Personal protective clothing may also be required e.g. gloves, eye protection, waterproof clothing

## HEALTH SURVEILLANCE

There is no recommended medical screening for this condition.

Each individual with the potential to be at risk should be issued with details of the condition, who is at risk, what the symptoms are, and what they should do should they be concerned they may have contracted the condition.

If an individual believes they may have contacted the condition they should seek medical advice immediately explaining their potential exposure to Weil's disease.

If an employee has contracted this condition it is reportable under RIDDOR<sup>22</sup>.

## **Fitness for Work**

There are few medical conditions that should prevent individuals from this type of work; the following are conditions that will require careful consideration and possible assessment with an occupational health professional.

1. Individuals with recurrent or long term skin disorders that predispose to infection. If areas of broken skin cannot be suitably covered with a waterproof dressing then the individual may need to avoid work with sewage until the condition has been brought under control by medical treatment.
2. Individuals who are at a greater risk from infection, for example individuals undergoing chemotherapy treatment or suffering from a disease causing immunosuppression, such as leukaemia.
3. Individuals fitness for high risk activities, such as confined space work and wearing of breathing apparatus when working with sewage must be assessed by a suitably qualified person on a regular basis.
4. Individuals with medical conditions such as epilepsy or diabetes on insulin, where the condition is not completely controlled by treatment and consequently the individual may be at risk of collapse in the hazardous working environment.

## ENVIRONMENTS

Before employers can introduce measures to protect the health of employees they must first consider the entry routes for contact and exposure, which may be different for different environments.

### Drains, Sewers and Pumping Stations

- (a) **Ingestion** is the major route of spread of infection from sewage to workers. This is likely to occur during splashes, and hand-to-mouth contact i.e. eating, drinking, smoking or wiping the face with contaminated hands. Contamination may also occur from dry surfaces where contamination may not be visible or obvious.
- (b) **Skin contact** with sewage can be direct or in-direct through cuts, scratches or penetrating wounds. Cracked skin and open wounds are particularly susceptible to infection. Contamination can also occur by touching the eye surface.
- (c) **Inhalation** Exposure is normally from aerosols generated by splashes, sprays, dusts and other operations such as jetting activities, and brushing or sweeping. There are also risks from harmful gases present or from oxygen deficiency.
- (d) **Injection** This can occur through penetrating wounds i.e. from discarded needles or other sharp objects such as razor blades, broken glass, or from water jetting.

### Septic tanks and cesspits

These environments will be of particular interest to homeowners and tanker drivers.

- (a) **Ingestion** is the major route of spread of infection from sewage to workers. This is likely to occur during splashes, and hand-to-mouth contact i.e. eating, drinking, smoking or wiping the face with contaminated hands.
- (b) **Skin contact** with sewage can be direct or in-direct through cuts, scratches or penetrating wounds. Cracked skin and open wounds are particularly susceptible to infection. Infections can also occur by touching the eye surface with contaminated hands.
- (c) **Inhalation** Exposure is normally from aerosols generated by splashes, sprays and other operations such as jetting activities. There are also risks from harmful gases present or from oxygen deficiency.
- (d) **Injection** This can occur through penetrating wounds i.e. from discarded needles or other sharp objects such as razor blades, broken glass or from water jetting.

## Sewage treatment works

- (a) **Ingestion** This is an area where people are at risk from contact with contaminated surfaces due to aerosols and splashes that land on surfaces and on individuals working in the area. Ingestion usually is a result of hand-to-mouth contact i.e. eating, drinking, smoking or wiping the face with contaminated hands. Areas at risk include inlet works, screenrooms and aeration tanks.
- (b) **Skin contact** with sewage can be direct or in-direct through cuts, scratches or penetrating wounds. Cracked skin and open wounds are particularly susceptible to infection. Infections can also occur by touching the eye surface with contaminated hands. This can occur almost everywhere on a sewage treatment works, e.g. handrails, as all surfaces are likely to be contaminated.
- (c) **Inhalation** Exposure is normally from aerosols generated by splashes, and sprays. This can occur within the processes such as thickeners, belt-presses, aeration tanks, trickle filters and filter beds. Activities such as hosing and venting of tanks can produce aerosols. There are also risks from harmful gases present or from oxygen deficiency. And on those sites carrying out sewage sludge drying, inhalation from dust from dried sewage is a risk.
- (d) **Injection** This can occur through penetrating wounds i.e. from discarded needles / hypodermic syringes or other sharp objects such as broken glass that may get trapped in screens or from water jetting.

## Transport

This environment covers the transportation of secondary sludge or cake, and includes work vehicle interiors.

- (a) **Ingestion** is usually the result of hand-to-mouth contact i.e. eating, drinking, smoking or wiping the face with contaminated hands. Hands can become contaminated following contact with contaminated clothing and/or tools and fittings. I.e. hose fittings.
- (b) **Skin contact** with sewage sludge can be direct or in-direct through cuts, scratches or penetrating wounds. Cracked skin and open wounds are particularly susceptible to infection. Infections can also occur by touching the eye surface with contaminated hands.
- (c) **Inhalation** Exposure is normally from aerosols generated by splashes, and sprays. These can occur from hosing down pipes/fittings and from venting of tanks. However, in situations where dried sludge is being transferred from holding vessels into road vehicles dust may be generated which could then enter the body via the respiratory system

## Other working environments

Other working environments where employees may be exposed to sewage include dealing with areas subject to sewer flooding, and peripatetic workers such as Trade effluent samplers.

- (a) **Ingestion** is the major route of spread of infection from sewage to workers. This is likely to occur during splashes, and hand to mouth contact i.e. eating, drinking, smoking or wiping the face with contaminated hands.
- (b) **Skin contact** with sewage can be direct or in-direct through cuts, scratches or penetrating wounds. Cracked skin and open wounds are particularly susceptible to infection. Infections can also occur by touching the eye surface with contaminated hands.
- (c) **Inhalation** Exposure is normally from aerosols generated by splashes, sprays and other operations such as jetting activities.
- (d) **Injection** can occur through penetrating wounds i.e. from discarded needles or other sharp objects such as razor blades or broken glass, or from water jetting.

## CONTROL MEASURES

The first consideration in controlling the hazards associated with sewage and its by-products should be, in all cases, to consider the possibility of eliminating the need for contact, or working in close proximity to, sewage and its by-products. Risk Assessments for work of this kind should always consider if there is a reasonably practicable way to avoid the need for contact with sewage. Possible means to avoiding contact could include the use of CCTV systems, robot moles for clearing blockages in sewers, hand tools for handling or lifting objects contaminated by sewage, etc.

In addition, the need to eliminate the hazards associated with sewage at source, e.g. through the use of Local Exhaust Ventilation systems etc, should always be assessed and implemented where reasonably practicable.

Where work that involves contact with sewage is unavoidable, the best control measure available is good personal hygiene practice on the part of the individuals involved in that work. For further guidance, see 'Personal Hygiene' section.

### Protecting workers from risks to health

This may be achieved by ensuring that employees:

- (i) Understand the nature of the risk,
- (ii) Are properly informed and trained,

- (iii) Are competently supervised,
- (iv) Are provided with and use suitable personal protective equipment where appropriate,
- (v) Follow a safe system of work,
- (vi) Have access to adequate welfare and First Aid facilities,
- (vii) Know what to do if they develop an infection or become ill, and carry an information card<sup>13</sup>, and
- (viii) In the design of new plant consideration should be given to minimising exposure of employees.

The use of personal protective equipment (PPE), and reliance on immunisation against a limited number of diseases associated with sewage, should not be considered as primary means of controlling exposure to the hazards associated with working with sewage. For further guidance see the “PPE” section and the appendix on “Immunisation” in this document.

Note: the control measures discussed below relate to the hazards associated with sewage. In many cases, work involving sewage will involve entry to confined spaces, and this may mean that additional control measures, including the use of breathing apparatus or fixed or portable gas monitoring equipment, may be required.<sup>16</sup> Persons expected to enter some spaces containing sewage may need to meet certain fitness requirements. This document does not discuss these control measures, and reference should be made to the local procedures in place where the work is to be carried out, and further guidance is available in other Water UK publications.

## **PERSONAL HYGIENE**

This section provides guidance on achieving and maintaining a high standard of hygiene for all persons that come into contact with sewage.

### **Welfare facilities**

#### **(a) Hygiene facilities**

All persons that come into contact with sewage must have access to a means of cleansing exposed skin areas.

Adequate washing facilities should be available either on site or within a reasonable travelling distance. It is considered best industry practice to provide warm running water, liquid soap in a dispenser and disposable paper towels as a means to dry hands. Where possible facilities should be utilised on site. Where this is not practicable a suitably designed vehicle with facilities on board comprising of a hot water unit, liquid soap and

disposable towels should be provided. Hand wipes or waterless cleansing gel should be available for when washing facilities are not available.

The provision of conditioning hand cream is recommended to replace the skins natural oils after each hand wash. Nailbrushes should only be provided for individual use and stored safely with bristles upwards so they remain clean and dry when not in use. When using nail brushes care must be taken not to abrade the skin creating an 'open' wound.

Showers or access to running water should be provided where there is a risk of gross contamination occurring. In some circumstances where welfare amenities are not available nearby, it may be necessary to consider bringing in portable facilities.

#### **(b) Rest breaks and meal breaks**

Designated mess rooms away from the main work areas in which to eat and take rest breaks should be available. These areas should be clearly defined and kept free from any possible contamination by leaving any protective clothing and boots in a separate area and washing hands before entering.

It is recommended that work schedules be arranged wherever possible to include breaks at sites where welfare facilities are available.

Eating areas should be cleaned regularly and kept free of clutter. Cleaning facilities such as a dishwasher or sink with hot and cold water should be provided. Detergent and suitable clean dishcloths should be readily available. Kitchen areas including cooking facilities and all surfaces should be left clean after use. Refrigerators should be emptied of leftover food and cleaned when possible on a weekly basis.

It is recommended that mess rooms should be thoroughly cleaned, as a minimum twice-weekly dependant on usage.

#### **(c) Storage and changing facilities**

A designated changing area should be available with a system in place for the separate storage of dirty and clean clothing. The provision of a soiled clothing locker or bin should be available in the changing rooms. Locker facilities to store personal items and clean clothing safely should be provided. Adequate provision should be made for non-contaminated clothing to be available.

#### **(d) Cleaning of work wear and PPE**

Contaminated work wear or overalls should not be taken into the home or home to wash. Laundry facilities should be provided either in the form of an offsite contracted laundry service or onsite washing machines capable of washing the work wear at the appropriate temperatures. Persons working with sewage must be provided with adequate and appropriate work wear, which should be for sole use and labelled accordingly. Work

wear provided should be capable of being washed at the required temperatures.

Waterproof clothing, rubber or safety boots, which have become contaminated with sewage, should be hosed, scrubbed clean and dried as soon as possible. If contamination has occurred on the inside of waterproof clothing and cannot be satisfactorily cleaned, this will need to be disposed of and replaced.

Before removing contaminated clothing as much debris as possible should be removed. Careful consideration should be given in how to remove the contaminated clothing to minimise contact with clean clothing or skin. Following heavy contamination, goggles, respiratory equipment and gloves should remain in place until the clothing has been removed. After removing the soiled clothing this should be bagged or placed in designated collection receptacle for soiled clothing.

Gloves should be washed prior to the removal of clothing and after clothing has been removed. If gloves cannot be cleaned they should be disposed of in a suitable receptacle. Disposable gloves should be for single use only and disposed of after each use.

Goggles should be cleaned after each use. If washing does not remove the debris they should be disposed of and replaced.

### **(e) Vehicles**

A system for the segregation of dirty equipment and clothing should be established within vehicles. The cab should be kept clean and free from contamination by removing contaminated overalls and washing hands prior to entering. It is preferable to have the cab separated from the storage area by a bulkhead. Hard surface wipes should be available to allow cleaning of the steering wheel and surfaces within the cab that may become contaminated. Disposable, waterproof seat covers should be considered where there is a possibility of contamination.

Eating, drinking and smoking should be discouraged within vehicles used by persons working with sewage.

### **Handwashing**

It is widely acknowledged that hand washing is one of the most important procedures in the protection against infectious disease. Hands are the principle route by which microorganisms are transmitted to both self and others. Educating persons who come into contact with sewage about appropriate personal hygiene practices and good hand washing techniques is essential in preventing illnesses.

The frequency of hand washing will be dependent on the activities carried out, but hands should always be washed:

- before and after going to the toilet,



- after working with sewage or sewage products,
- before eating, drinking, rolling or smoking a cigarette,
- before and after dressing wounds,
- after working on machinery,
- after work near slow or stagnant effluent or areas where animals may have been present.

Hand washing with liquid soap and warm water is adequate in removing harmful microorganisms if the correct technique is followed:

- It is recommended that hands are wetted under warm running water.
- Dispense one dose of liquid soap into cupped hand.
- Hand wash without adding more water for 15 seconds, rubbing all surfaces vigorously including wrists, palms, back of hands, fingers and thumbs. (Studies of hand washing in health-care indicate that the fingernails and the web spaces between the fingers are commonly neglected and can harbour microorganisms unless washed thoroughly.)
- Rinse hands thoroughly under running water.
- Hands should then be dried thoroughly. It is recommended that disposable paper towels should be the preferred method of drying hands to avoid cross-contamination. If cloth towels are provided they should be kept for individual use and changed daily.

When hands are heavily soiled a nailbrush may be required. These should be issued for personal use only and stored safely so they dry when not in use. It is recommended that fingernails should be kept short and nail biting discouraged.

### **Skin care**

It is essential that soap be thoroughly rinsed following hand washing as this can have a drying effect upon the skin if not removed adequately. Hands should be dried thoroughly, particularly in the winter months when they have a tendency to become chapped.

Conditioning creams should be provided and applied to replace the natural oils from the skin lost as a result of frequent hand washing. This should be applied following each hand wash, but as a minimum at the beginning and end of each shift.

If cuts or grazes occur they should be washed immediately with clean running water or sterile cleansing wipes and a sterile waterproof dressing applied. All existing cuts and grazes should be covered with a waterproof dressing before starting work. Large wounds that cannot be covered with a standard waterproof dressing may require larger dressings used in conjunction with protective waterproof gloves or clothing. If a person is experiencing skin problems, such as dermatitis that cannot be covered with a waterproof

dressings they should be temporarily be removed from work where there is any possibility of contamination until healing occurs.

### **Contamination or Medical Emergencies**

If significant contamination has occurred a shower should be taken as soon as possible. In the event of sewage splashes to eyes, face or any exposed part of the body it should be washed off immediately using copious amounts of water (preferably tap water if available). Alternatively, eyes should be washed with sterile eyewash. Medical advice should be sought subsequently.

If complete immersion occurs the individual should be taken for immediate medical assessment. Disposable coveralls and a blanket stored in dust free packaging should be available in the event of serious contamination from sewage when clothing must be removed and hypothermia or traumatic shock may occur.

### **First-Aid**

Waterproof dressings (of a non-ventilated type) must be available together with a means of irrigating the eye. (Sterile or fresh running water). And a means of cleaning a wound (Running water or antiseptic wipes)

## **PERSONAL PROTECTIVE EQUIPMENT**

Suitable PPE must be provided appropriate to the risk.<sup>7</sup> PPE should always be considered the last resort and all other means of avoiding exposure should be explored.

**Clothing:** As a minimum coveralls, should be provided where gross contamination is unlikely to occur. In areas where gross contamination is likely then impervious waterproof suits and suitable waterproof foot protection is essential.

**Hand protection:** The choice of gloves should be based on the likely damage to gloves, and also considers the extent of contamination.<sup>18</sup> For example for short duration work requiring dexterity then nitrile disposable gloves may be appropriate. However for heavier work on contaminated equipment such as a wet well pump then a heavier duty glove such as PVC gauntlets should be worn. Knitted or canvas cuffs should be avoided as they become easily contaminated when wet.

**Respiratory protection: (RPE)** In some situations RPE may be required.<sup>8</sup> The type of RPE should be determined following an assessment of the hazard. For example for protection against dust a disposable FFP2 disposable half mask respirator *may* be sufficient; for work in areas where there is oxygen deficiency then breathing apparatus will be necessary.

Face and Eye protection: this will be required where splashes are likely e.g. when hosing down. The level of protection required i.e. full-face visor to goggles, must be determined by risk assessment.

Where PPE is provided adequate training must be provided on the use and care of such equipment. Provision must be made for the cleaning, storage and maintenance of such equipment that should not be taken home by employees. Proper removal and disposal of PPE should be taken into consideration – see section on Personal Hygiene.

## **SPECIFIC CONTROL MEASURES FOR DIFFERENT ENVIRONMENTS**

### **Drains, Sewers and Pumping Stations**

The job, which may occur at sites without fixed welfare facilities, should be set-up to ensure that adequate welfare facilities that are planned as part of the job. (This should be met even if staff are driving to site).

#### **Other control measures based on risk assessment**

In all situations where hand contact with sewage or objects contaminated with sewage is likely (e.g. when handling or repairing a pump in a wet well) consideration must always be given to using a hand tool to avoid the need for direct contact with the object, e.g., tongs or other such implements can be used to remove objects from wells, sewers, etc. Various types of tool are available (e.g. corkscrews) for removing rag and other blockages from pipes, pumps, etc. The general rule – ‘if you can’t see where you are putting your hand, don’t put it there’ should be applied to manual work involving objects contaminated with sewage.

### **Septic tanks and cesspits**

The main risks occur when these are being emptied and when hosepipes are being connected. Hoses should be cleaned down so far is reasonable practicable after immersing in septic tanks and emptying contents.

### **Sewage Treatment works**

Situations on sewage treatment works where employees and contractors are likely to be exposed are when operational and maintenance tasks are being carried out. Other people potentially at risk may include samplers, delivery drivers, grass-cutters etc.

#### **Welfare**

Sites that are not manned full-time should have facilities that are proportional to the risk in the local work area (which may include a number of sites) and the risks associated with the work activity.

## **Other control measures based on risk assessment**

In all situations where hand contact with sewage or objects contaminated with sewage is likely (e.g. when cleaning screens) consideration must always be given to using a hand tool to avoid the need for direct contact with the object; e.g. tongs or other such implements can be used to remove objects from wells, sewers, etc. Various types of tool are available (e.g. corkscrews) for removing rag and other blockages from pipes, pumps, etc. The general rule – ‘if you can’t see where you are putting your hand, don’t put it there’ should be applied to manual work involving objects contaminated with sewage.

## **Transport**

### Welfare

Welfare facilities should be available whatever the job either in the vehicle or at either end of the journey.

Personal Protective equipment (PPE) there should be adequate storage for clean and dirty PPE on vehicles.

## **Other working environments**

School visits and members of the public: Where members of the public are likely to be invited to sewage treatment works, or other places (e.g. Pumping Stations) special precautions may need to be taken. All the control measures relating to work with sewage need to be used as and where appropriate. Children under 5 should not be encouraged on sewage treatment works.

New and Expectant Workers: Employers should conduct a risk assessment, with reference to an Occupational Health specialist, if any worker who is exposed to sewage becomes pregnant<sup>25</sup> and after delivery on return to work, especially if breast-feeding.

## **APPENDIX I**

### **IMMUNISATIONS**

In the past some water companies in the UK routinely offered inoculations against Tetanus, Polio and Hepatitis (A and/or B) to employees involved in work with sewage.

The HSE (Utilities National Interest Group) and the Employment Medical Advisory Service (EMAS) advise, and current research suggests that the need for inoculation of workers likely to be exposed to sewage is significantly lower than it was in the past. In particular, the incidence of Hepatitis A in the general population (in the UK) has declined significantly in the past 20 years; to the extent that routine immunisation against Hepatitis A is no longer recommended for workers likely to come in contact with sewage.

Similarly, the need for routine Hepatitis B inoculation is not recommended, but may be required should risk assessment determine there is a need. (See section on Hepatitis B below).

An Occupational Health Physician or their own GP, however, should assess persons with problems affecting their immune system, on an individual basis.

There is still a requirement, however, for maintaining immunisation against Tetanus and Polio, but the regimen should be that currently recommended by the Department of Health in the 'Green Book'.<sup>26</sup>

#### **Hepatitis A.**

Hepatitis A is a water-borne virus that can be found in sewage. Infection usually results in a mild disease characterised by a mild inflammation of the liver, with jaundice and complete recovery usually occurs over a period of weeks.

The number of people contracting Hepatitis A has decreased greatly over the past 10 years.

Research has shown no consistent evidence that sewage workers are more likely to catch Hepatitis A, than members of the public or persons in other occupations. (Ref: Glas, Hotz and Steffen, 2001)

Immunisation against Hepatitis A is available, and takes the form of two injections administered some months apart.

Because of the low incidence in the general population in the UK, and the low risk of infection amongst sewage workers, HSE and Occupational Health Physicians do not recommend blanket immunisation of sewage workers.

## **Hepatitis B.**

Hepatitis B is a completely different virus to that causing Hepatitis A. It often results in a more severe, and sometimes fatal illness. It can cause long-term disability, and a chronic carrier state and has been associated with an increased risk of liver cancer. Hepatitis B is usually transmitted by sexual intercourse, sharing of needles and syringes, or through wounds contaminated with infected blood.

The virus does not survive in raw sewage; i.e. blood and bodily fluids diluted in sewage do not present a significant risk of infection from Hepatitis B. Bodily fluids therefore have to be present in some container (e.g. a syringe or a needle), and the contents would have to be ingested or injected for there to be a risk of infection.

The Hepatitis B virus is able to survive outside the body in dried blood for up to one month and there is therefore a risk of sewage workers coming into contact with syringes or needles with live virus in them, but this risk is low, particularly when compared, e.g., to workers in the healthcare sector.

A course of immunisation is possible for Hepatitis B, and this involves multiple visits to a doctor's and monitoring of blood levels of the antibodies.

The same, highly effective treatment to prevent Hepatitis B can be given after a needle stick injury if a medical risk assessment shows that the injury has created a high risk of infection.

The decision to immunise against Hepatitis B should be made on the basis of Risk Assessment. The Risk Assessment should take into account the likelihood that employees may come in contact with the live virus in used syringes or needles.

It is recommended that if employees are likely to encounter needles or other sharp objects, the employer must initiate a program to reduce the risk of needle stick injuries. Employees should report all needle stick injuries to their management immediately, and then attend at an Accident and Emergency unit or at their own GPs.

The best form of prevention of Hepatitis B infection is the prevention of needle stick injuries, not immunisation against Hepatitis B.

Water companies should consider initiating a program to reduce needle stick injuries by looking at the design of all work tasks, use of customised tools where possible, and the issue of the best available PPE.

Prevention of needle stick and sharp injuries is very important, because there are other diseases that can be transmitted this way for which there are no vaccines available.

## **Polio and Tetanus.**

Poliomyelitis.

Polio (poliomyelitis) is a serious illness caused by the poliovirus. The virus first infects the gut, but then travels to the nervous system and can cause a meningitis-like illness. This can sometimes leave permanent damage to some nerves. This can lead to wasting of some muscles, and can sometimes cause paralysis of arms or legs. The illness can seriously affect breathing in some people and may lead to death. Polio is now extremely rare in the UK because of the success of immunisation.

Tetanus.

Tetanus is a serious infection that affects the nerves, and is often fatal. Tetanus bacteria live in the soil and dirt. The bacteria may get into the body through a cut or a wound in the skin. The bacteria make a toxin that causes the illness. Even small wounds such as a prick from a thorn can allow enough bacteria to get into the body to cause tetanus. The illness takes up to 21 days to develop, sometimes more.

General Practitioners – GPs or family doctors – are paid by the government to ensure that all adults in the UK have an up-to-date Polio and Tetanus inoculation. The standard level of inoculation in the population is therefore fairly high, and there is little evidence to show that sewage workers have a higher incidence of these diseases.

It is recommended that workers likely to come into contact with sewage check with their GP that their Polio and Tetanus boosters are up to date.

## **Preventing Infection:**

The key to prevention of infection when working with sewage is not to give inoculations against a very small number of diseases.

Prevention of infection can be achieved through employees observing the highest possible standards of personal hygiene when working with sewage or equipment contaminated with sewage, use equipment provided and utilise the information, instruction and training provided to them by their employer.

An active program of avoiding contact with contaminated needles and other sharps should be pursued, and at all times the avoidance of direct hand contact with sharps, through the use of tools, etc, should be enforced.

## APPENDIX II

### LEGAL REFERENCES

**1 The Health and Safety at Work etc Act** requires employers to ensure, so far as is reasonably practicable, the health, safety and welfare of their employees, other people at work, and members of the public who may be affected by the work. This duty extends to the provision and maintenance of a working environment for employees that is safe, without risks to health and has adequate welfare arrangements.

**2 The Control of Substances Hazardous to Health Regulations.** Amongst the requirements of the regulations are the need to conduct an assessment of the risks presented by biological agents and hazardous substances, and to decide what precautions are required to prevent or control exposure. Employees should be properly informed, trained and supervised with regard to the risks associated with exposure to hazardous substances and biological agents.

**3 The Management of Health and Safety at Work Regulations** require employers to plan, control, organise, monitor and review their work. This process should include an assessment of the health and safety risks arising from the work activity that identifies the control measures necessary to control the risks. Risk assessments may be used as a reference for developing safe systems of work.

**4 The Workplace (Health, Safety and Welfare) Regulations** and the associated Approved Code of Practice describe the necessary welfare arrangements, including washing facilities, sanitary conveniences, facilities for changing clothing and for eating meals. They also set out the requirement to maintain plant in a clean condition.

**5 The Construction (Health, Safety and Welfare) Regulations.** When construction work is being undertaken in environments likely to result in exposure to sewage, then the provisions of the Construction Regulations should be considered. These include requirements, similar to the Workplace Regulations, for suitable welfare facilities.

**6 The Confined Spaces Regulations** require the avoidance of entry into confined spaces, or where entry is unavoidable the use of a safe system of work and the provision of adequate emergency arrangements. There are many health risks associated with working in confined spaces.

**7 The Personal Protective Equipment Regulations** require employers to provide suitable personal protective equipment to those employees that require it unless the risk has been adequately controlled by other means. Adequate training in the use and care of the PPE should be provided for



employees and provision should be made for the cleaning, storage and maintenance of the equipment as appropriate.

**8 Health and Safety (First-Aid) Regulations** require the provision of adequate and appropriate equipment, facilities and personnel to enable first-aid to be given to employees if they are injured or become ill at work.

**9 Reporting of Injuries, Diseases and Dangerous Occurrences Regulations** require that certain accidents and cases of disease that arise from work activity are reported. Employees must report accidents involving their employees, and whoever is in control of the site must report accidents involving the self-employed. Diseases that are reportable under the Regulations include hepatitis, leptospirosis (Weil's Disease), tetanus, and conditions such as occupational dermatitis and hand-arm vibration syndrome.

## REFERENCES AND FURTHER READING

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- 24 Sewage Sludge Drying Plant. Operational Circular 847/9 and Information Document. HSE 2005. Available from HSE website.
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- 26 Immunisations Against Infectious Disease, 1996 – 'The Green Book' available from [www.dh.gov.uk](http://www.dh.gov.uk)

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