



OCCASIONAL GUIDANCE NOTE

The Classification & Management of Confined Space Entries

INDUSTRY GUIDANCE

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Notes:

- ❖ The only change between **2nd Edition June 2006** and **Edition 2.1 Oct 2008** is in Section 6. The three changed words are in ***bold italic*** on page 16.
- ❖ The only change in **Edition 2.2 Oct 2009** is the removal of reference to superceded City & Guilds qualifications.

The Energy and Utility Skills Council (EUSC) have developed National Occupational Standards (NOS) for entry into confined spaces. The Water industry has produced this Occasional Guidance Note (OGN) to record a number of risk assessment and control measures including these in support the use of these competency standards. The standards were developed by representatives from the water industry including training providers.. The five qualifications which are available have been developed by awarding bodies and incorporate this OGN to underpin the conditions placed upon those organisations that will be carrying out assessment against these standards.

Foreword

Deaths in confined spaces are always distressing, particularly when there are well intentioned but reckless attempts at rescue, with devastation for families, and sometimes the complete collapse of a small business.

Water UK is dedicated to consolidating the industry's good assessment and control measures. We are not complacent. Since we are continually mindful that tragedy could strike at any time, the industry has sought through mutual support and public events such as the Confined Spaces Competition to keep the risks of confined space entry uppermost in the systems used by water organisations and those who work with us.

Although water organisations and contractors generally have well practised health and safety systems, there is room for confusion. The structure of the industry continues to change. Vast improvements in customer service and environmental protection do mean that traditional local working methods have the potential to be less well understood. In particular, the widespread use of indirect labour introduces a multiplicity of practices for training, entry and rescue.

For this reason, the Health and Safety Executive requested that industry guidelines be produced. Rob Gwyther and Richard Locke as successive Chairs of the Water UK Occupational Health and Safety Group (WUKOHSG) have guided a process which will bring some clarity and uniformity to assessments and controls without overturning the traditional systems of work which have been successful for individual organisations. In addition, the WUKOHSG's objective has been to enable the freer movement of contractors between client companies, with less chance of confusion and lower re-training costs. There have been many other related objectives too, not least the standardisation of medical "fitness for entry" procedures. I am delighted that many people have supported this initiative and in particular that David Hellier, Strategy and Development Manager at Energy and Utility Skills, has contributed his vast experience and knowledge to development of the OGN.

I am confident that the approach we have developed will create greater efficiencies for Water UK members and their contractors. Most importantly, robust attention to confined space entry will enable the prevention of the misery which attends tragic and unnecessary deaths at work.

Bob Baty
On behalf of the Council of Water UK
31 August 2006

Introduction

The number of fatalities and injuries that occur in industry while people are working in confined spaces led to the enactment of specific legislation: The Confined Spaces Regulations 1997. These became law in 1998.

Water Companies have, for many decades recognised the special hazards and risks associated with confined space working. A range of reliable and robust Policies Procedures and Arrangement (PPA's) have been developed within the water companies that are designed to ensure that confined spaces work is carried out safely, in accordance with the regulations and with proper controls in place.

Originally most of this confined space entry work was undertaken by the water companies Direct Labour Organisations (DLO). More recently, increasing use of indirect labour has resulted in adaptations of the PPA's by some individual water companies to include specific instructions to contractors. The result was a diverse and inconsistent specification of skills, training and equipment being required of contractors before they can work in each water company's confined spaces.

It is important to acknowledge that this diversity in PPA's, is not, of itself, an issue for any one water company or its DLO. Nor was it, for very many years a significant issue for contractors, many of whom were small local undertakings often only working with one client Water Company.

Today's contracting world is very different with an increasing number of organisations able to provide labour across water company boundaries and often able to provide national coverage.

The need therefore to significantly reduce the potential risk of confusion amongst peripatetic/multi-client contractors was accepted.

To compensate for the previous diversity of PPA's some water companies required contractors to purchase training covering their own specific procedures but this added to the potential for confusion.

The diversity of detailed PPA's also resulted in a contractor's staff being trained, and then retrained, to meet each separate client's requirements. In addition to the burden of cost, it is considered that the resultant over exposure to the diversity of confined spaces training led to a devaluation of its intended purpose.

Water UK's member company's specialist health and safety advisors were aware of these issues. At the inaugural meeting of the Water UK Health & Safety Horizontal Group at Tadley Court on 10 November 1998, it was agreed that a solution to diversification of confined space entry requirements for contractors should be found.

A Water UK Confined Space Management Group (WUKCSMG) chaired by Bob Passmore was formed and terms of reference for a project to achieve rationalisation for confined space entries by contractors were set down.

The Confined Spaces Rationalisation Project was confirmed as a “specific agreed action” in Water UK’s 10 year Occupational Health & Safety Strategy Business Plan – Water Ahead - A Joint Water/HSC Strategic Business Plan for Occupational Health and Safety for the Water Industry.

Working jointly with HSE, WUKCSMG has delivered an approach centred upon four standardised National Classifications for confined space entries. These have been carefully crafted to ensure that a Contract Specifier may overlay the local water company’s classification and express the requirement to contractors in nationally recognisable and standardised terms.

WUKCSMG involved some of the most experienced and knowledgeable safety professionals in the industry including Jeff Maddin, John Corden, Ian Cartwright, Chris Lee, Stuart Spencer, Jane May, and HSE’s specialist Steve Catteral.

A key concern throughout the development of the solution was to assure the continued protection of the DLO. WUKCSMG has engineered a solution that avoids any compulsory changes to water companies currently adopted PPA’s for DLO’s, yet provides a single national standard when specifying to contractors.

WUKCSMG was also tasked to resolve the previous lack of consistency in training standards.

At this point Energy & Utilities Skills (EUS) took on the role of developing the National Occupational Standards (NOS). Water UK was closely involved in the development.

The NOS are expressed as statements of competence and people will be assessed against these. Awarding bodies approve and operate a quality assurance system for centres to carry out assessment. This also leaves the market for training providers free and open to competition. Individual providers are able to innovate and use their professional skills in training course design and delivery, whilst ensuring that all candidates reach a common prescribed output standard of competence after training.

It is now up to each water company to specify the Entry Classification for confined spaces under their control and therefore decide which NOS is appropriate.

Purpose

The purpose of this document is to provide a framework for the management of entry into confined spaces for contractors working for or on behalf of water companies in the United Kingdom.

The document contains National Classifications for entries to confined spaces. These are to enable a water company to specify entries to contractors using nationally agreed and understood system whilst allowing the water company to continue to use its local classifications.

The document also sets out for the first time nationally agreed minimum standards of management and operational performance, equipment and competence to be achieved by contractors.

The Classification system recognises that the system of work or precautions that may need to be taken for entry into a confined space will differ with the hazards, degree of risk, complexity of the operation and the location.

The National Classification system (NC) established by Water UK for confined space entries made by contractors to water companies identifies 4 entry categories designated NC1, NC2, NC3 and NC4. However, Water Companies may have their own classifications. They will be able to relate these to the new classifications, low, medium and high risk confined spaces, within the NOS.

SECTION 1. Identification of Common Hazards & Controls

In the regulations a Confined Space is described as having two defining features:

- It is a place which is substantially (though not always entirely) enclosed and,
- There will be a reasonably foreseeable risk of serious personal injury from hazardous substances or conditions within the space or nearby.

The Confined Space Regulations defines those risks, which must be assessed, as, **Specified Risks**.

These **Specified Risks** are: -

- Loss of consciousness arising from gas, fumes, vapours or the lack of oxygen
- Loss of consciousness arising from an increase in body temperature
- Serious injury arising from a fire or explosion
- Drowning from an increase in the level of liquid
- Asphyxiation from a free flowing solid or inability to reach a respirable atmosphere due to entrapment in a free flowing solid.

Typical examples of areas in the Water Industry, which are both, enclosed and in which the presence of a **Specified Risk** is reasonably foreseeable include: -

- Manholes
- Sewers
- Underground tanks and reservoirs
- Adits and tunnels
- Pipelines
- Septic tanks and cesspools
- Pump wells, boreholes, surge and pressure vessels
- Trenches
- Above ground sludge tanks and screen channels.

All of these areas are likely to be **Confined Spaces** to which the regulations apply.

Appendix 1 identifies the common hazards, which may be encountered during confined space work in the water industry.

Hazards can be present as a result of the **intrinsic** use of the confined space e.g. a foul sewer will contain sewage, which can produce toxic or flammable gases.

In addition to the intrinsic hazards present, hazards may also be **introduced** as a result of the work being done e.g. toxic gas produced during a pipe relining project, the use of welding equipment etc.

Whilst not exhaustive, this guide to common intrinsic and introduced hazards found in the water industry may be of assistance in formulating a risk assessment. **This guide does not lessen the obligation to carry out a risk assessment.**

SECTION 2. Risk Assessment

There will be circumstances where a confined space is under the control of someone other than a water company's employee, who would usually carry out a risk assessment, and plan the confined space entry. An example of this will be work let to contractors.

The client and/or his appointed representative or principal contractor is responsible for obtaining and passing on the necessary information pertaining to the hazards to allow those organising/ carrying out the entry to effectively assess risk and classify the entry.

The organisation in control of the specific entry is responsible for the assessment and control of risk and shall establish the safe system of work (SSW). The person in direct control of the entry on site shall carry out an assessment of the actual state and condition found and determine whether or not it is safe to work under the system of work specified.

Such a local risk assessment may or may not be written down depending on the expected level of risk. However, if this local assessment identifies any unexpected risks e.g. cyanide, then it will automatically trigger a full re-assessment of the safe system of work (SSW)

All confined space entries require an assessment, which considers: -

- the need for entry to complete the task in hand
- the intrinsic hazards likely to be present in the particular workplace
- particular conditions and circumstances likely to increase or decrease risk
- any additional hazards likely to be introduced by the task in hand (fumes, sparks, electric shock, etc)
- the extent to which risk can be eliminated or controlled through either engineering controls or the system of work and competency of the operatives involved

This risk assessment will lead the assessor to a decision on the classification of the entry based on the Water UK National Classification Scheme for confined space entries **See Section 3.** (Note that it is the task-based entry which is classified and not the confined space itself)

SECTION 3. WATER UK National Classifications for Confined Space Entries

National classifications (NC) 1 to 3 are intended as generic standard methods of safe working which will be selected according to the risk assessment and the physical characteristics of the workplace.

In some circumstances these three standard generic methods and, the supporting control principles contained in **Section 4**, will not fully address the risks and thus classification NC4 will be appropriate.

NC4 classified entries necessitates the development of a detailed risk assessment and task specific Safe System of Work (SSW). Where appropriate the SSW will incorporate valving schedules, permits to work, gas test certificates, etc.

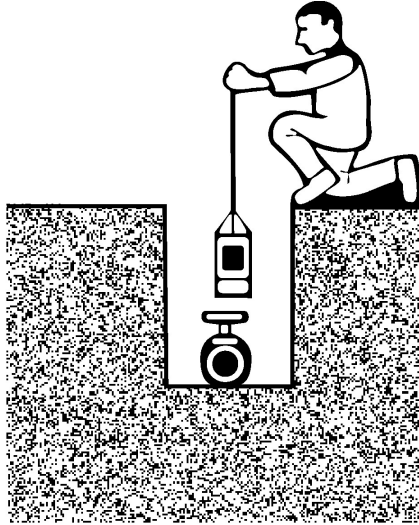
Circumstances, which might lead to NC4 classification, might include where: -

- fluid, mechanical or electrical isolation arrangements are complex
- structural conditions are in doubt
- underground systems are particularly deep or complex
- record drawings are in doubt;
- there is a history of serious atmosphere hazard;
- industrial waste discharges are insufficiently diluted to control harm from chemical, biological or radioactive agents
- the risk of drowning is only controlled by pumping or by tide
- the job involves hot work or a fume producing process
- the job requires electrical apparatus operating above Safety Extra Low Voltage (SELV) 25 volts or which is not explosion protected
- the work in hand is unfamiliar, complex or inherently hazardous

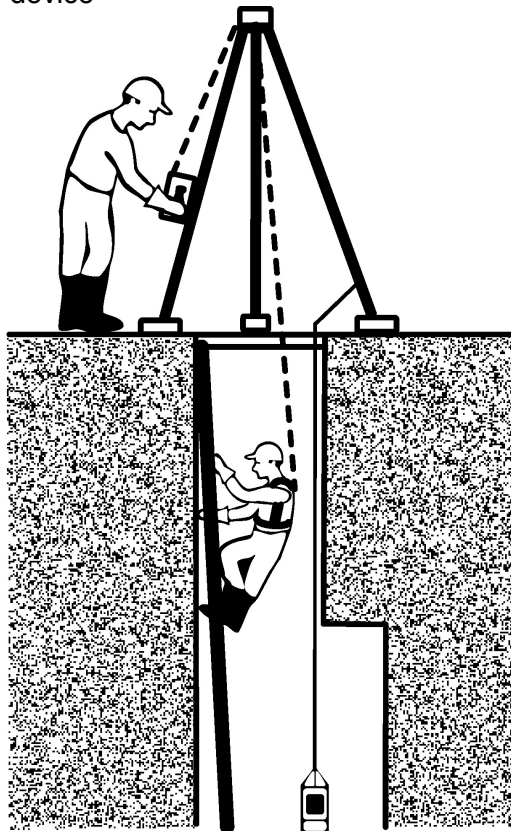
This list is not intended to be exhaustive.

WATER UK Classification of Entries - Definitions

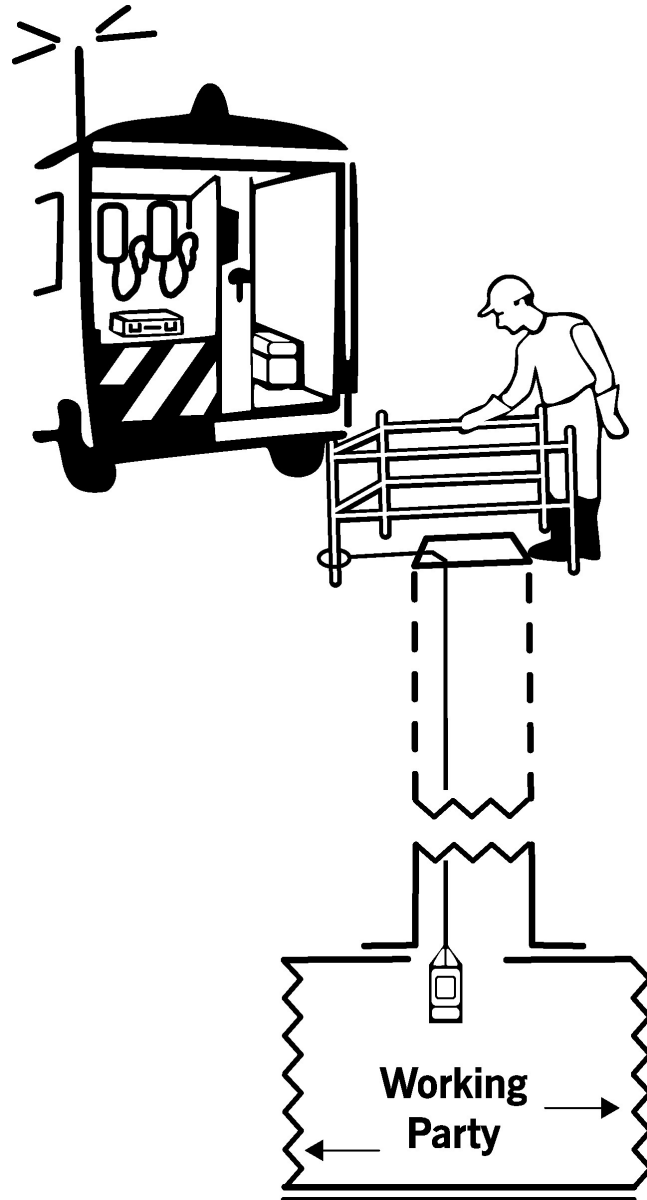
NC1 low risk shallow entry with adequate natural or mechanical ventilation, where access is simple and unobstructed and there is no likely risk of flooding e.g. meter pits, valve chambers, booster-pumping stations, PRV chambers



NC.2 Vertical direct unobstructed access with continuous attachment to a man riding hoist or similar mechanical rescue device



NC.3 when it is not possible to have persons permanently attached to a safety line. Usually it will be a team entry which moves away from the entry point e.g. Man entry sewers, utility service subway tunnels, aqueducts and complex wet wells. Working without an attached rescue line and includes working away from the point of entry



NC.4 Non standard entries involving complex operations which introduce additional risks and require specific controls and rescue arrangements e.g. mechanical hazards, physical complexity of system introduced hazards, enhanced specific intrinsic hazards.



Safe System of Work/Permit to Work

Reclassification

At the planning stage, the confined space entry will have been risk classified on the NC1 to NC4 scale. It is quite possible that at a later stage it may be reclassified to a higher or lower classification and may even be declassified.

An example might be a large underground structure which has been isolated at all inlet and outlet points, ventilated, residues removed, cleaned out and atmosphere tested. This might start out as an NC3 entry and revert to an NC1 or declassified status during, say repairs to brickwork. However in this example, should the structure need “chlorox spray” disinfection prior to re-commissioning, the classification would upgrade to NC4 and attract COSHH considerations and a specific safe system of work for that operation.

SECTION 4. Principles of Procedures to be adopted by Contractors Working at Confined Spaces.

The following principles will always apply:

- 4.1 All entries will be categorised in accordance with National Classifications NC1 to NC4
- 4.2 No person shall work in a confined space unless the entry category (NC1 to NC4) has been determined or confirmed through risk assessment. For NC4 the specific risk assessment required shall be documented.
- 4.3 Emergency arrangements will be put in place as determined in the risk assessment and shall include the provisions as set out in **Section 5**.
- 4.4 No person shall work in a confined space unless they are deemed physically and psychologically capable and medically fit for the work activity. Occasional visitors will also need to demonstrate a basic standard of fitness. A check list of medical conditions which would require medical guidance to be sought regarding a person's suitability for confined space work is provided in **Section 7**.
- 4.5 No person shall work in a confined space unless they have been adequately trained, assessed and certificated for the purpose. The requirements for training, assessment and certification are set out in **Section 8**.
- 4.6 No person shall enter a confined space (except for operations in National Classifications NC1) unless a safety attendant ("Top Man") directly controls the entry at the point of entry.
The "Top Man" shall be trained in accordance with specification given in **Section 8**. In deep or complex systems it may be necessary to post 'relay' safety attendants or 'Bottom Men'. Bottom Men will be trained in accordance with the specification of competence given for "Top Men" **see Section 8**.
The "Top Man" will have suitable equipment so as to be responsible for;
 - monitoring the atmosphere in the confined space prior to and during the entry.
 - maintaining communication with those working in the confined space,
 - summoning the emergency services in the event of an emergency.
- 4.7 No person shall enter a confined space without prior and continuous atmosphere monitoring which, as a minimum, monitors for
 - low oxygen
 - flammable gas
 - reasonably foreseeable toxic gases

Some processes may require specific monitoring e.g. Chlorine, Hydrogen Sulphide, Ozone, Sulphur Dioxide, Carbon monoxide. This will be determined by the risk assessment.

- 4.8 No person shall enter or work in a confined space unless they are equipped with and using the PPE specified in **Appendix 2**
- 4.9 Electrical or electronic apparatus will be explosion protected/flame proof unless the risk assessment establishes that there is negligible risk of any flammable atmosphere being present or developing. Where this principle is not practicable, the risk assessment should establish a system of work which incorporates appropriate control measures to prevent the build-up of flammable air mixtures or

automatically isolate unprotected electrical equipment. In the latter case this should not lead to further risks. Temporary electrical systems employed in a confined space shall be designed installed and maintained so as to prevent electrical shock.

- 4.10 All confined space entry points shall be effectively barriered unless continuously attended or other suitable means provided to prevent falls or unauthorised entry.
- 4.11 Suitable and sufficient welfare and hygiene arrangements shall be readily available.

SECTION 5. Self and Assisted Rescue at Confined Spaces

5.1 Self Rescue

Under normal operating conditions every person working in a confined space should be capable of removing themselves from the hazardous area without assistance. For NC2 classified entries this would include winching operations by the work team.

If a person(s) in the confined space becomes incapacitated, the other members of the work team should be able to assist them or sustain them in-situ pending arrival of an "Assisted Rescue" Team. This assumes a confined space 'specified Hazard' is not present.

Should a specified hazard be present the first priority is for each individual capable of doing so to affect an expedient exit from the confined space and for the planned assisted rescue provision to be called in to assist those unable to self rescue.

Proof of competence and training requirements for all members of work teams are contained in **Section 8**.

5.2 Assisted Rescue

Risk assessment may identify that it is appropriate to make arrangements for Assisted Rescue in the event that a person in a confined space may become incapacitated. Assisted Rescue means a dedicated team, appropriate to the work and location, whose only job is to be available to affect a rescue in such an emergency. These dedicated teams may be provided by in-house teams, specialist contractors or the emergency services by prior arrangement

Risk assessments must also take into consideration procedures for dealing with emergencies, even if Assisted Rescue Teams have been provided. This should include the distance the emergency services may have to travel, access to the work area, arrangements for meeting and guiding the emergency services, provision of information to the emergency services on the type of hazards, processes or chemicals that may be present, any additional hazard and any physical constraints of the confined space.

Where any work within a confined space is anticipated to last longer than five days, companies within their risk assessments will need to consider the appropriate notification to the Emergency Services.

SECTION 6. First Aid and Resuscitation

All persons who enter confined spaces or act as a "Top Man" must be suitably trained in emergency procedures, including emergency *first* aid and artificial resuscitation. Competencies and training requirements for all members of the work team are contained in **Section 8**.

When working/rescue breathing apparatus is provided/used a suitable means of resuscitation must be provided and the site team must include a *suitably trained* qualified First Aider. The First Aider must not be part of the team who enters the confined space, nor may he/she be the "Top Man" controlling the activity.

Where risk assessment identifies the possibility that a significant abnormal condition may develop, specialist first aid facilities and competence may be required.

If resuscitation is likely to be attempted within the Confined Space when breathing apparatus is being used, or if a person rendering assistance might be placed at risk from secondary inhalation of toxic gas during mouth-to-mouth, then the means of resuscitation must include a mechanical device.

The first aider must have received specialist training in the use of the specific resuscitation equipment provided.

SECTION 7. Medical Standards for Breathing Apparatus Wearers

Medical Fitness for Confined Space Work

Introduction

Within the water industry confined spaces can vary from open trenches (NC1) to sewers and other underground spaces (NC3). Some confined spaces will require breathing apparatus to be worn or carried, while other confined spaces will have no requirement for breathing apparatus.

Therefore the medical standards for confined space workers will vary with the space and task. It is recommended that employers undertaking risk assessment and medical assessments should consult with Occupational Health Practitioners. The following information is provided as guide to what could be included within a medical assessment. It is recommended confined space workers are subject to regular assessment.

Purpose

The purpose of medical standards for confined space workers is to give guidance to Occupational Health Practitioners, both doctors and nurses, when determining the fitness of personnel for confined space work. Cases of doubt should be referred to an Occupational Physician¹, seeking further details of the job requirements, if necessary.

Medical Assessment

The medical assessment has three functions:

- Is the worker medically fit to undertake the task?
- Is the worker able to use Breathing Apparatus?
- Is the worker at risk of sudden incapacitation?

Fitness for Task

Depending upon the task, the assessment may vary from confirmation that a pre-employment medical assessment was undertaken, to a special medical examination prior to the task. The purpose of the assessment is to ensure that there is an adequate level of cardiovascular, respiratory, musculoskeletal and neurological function to undertake the task.

Suggested Medical Assessments:

NC1 No specific assessment, beyond pre-employment assessment and reassessment after significant injury or illness².

¹ Where possible, the final decision on medical fitness, in borderline cases should rest with a Specialist Occupational Physician.

² All injuries or illnesses causing an absence of 4 weeks or more and any shorted absence which causes doubt as to the fitness for work.

NC2 Assessment on first undertaking confined space work, Reassessment after significant illness or injury.

NC3 Assessment on first undertaking confined space work Reassessment after significant illness or injury.

NC4 As NC3, plus any assessment required by the specific risks identified. For example work with radioactive agents may require the worker to be medically assessed in accordance with the Ionising Radiation Regulations 1999.

Fitness to use Breathing Apparatus

Breathing apparatus essentially consists of two types, self contained air breathing apparatus, worn during work and escape breathing apparatus, carried but only used in an emergency. The assessment should include spirometry, with workers who have either a low FVC (more than 1 litre below the expected value) or a low FEV¹ / FVC ratio (less than 70%) or those with a history of respiratory disease, eg asthma, being referred to an Occupational Physician.

Risk of Sudden Incapacitation

The Driver and Vehicle Licensing Agency (www.dvla.gov.uk) publishes medical standards for drivers, which are freely available and widely used by doctors. A significant function of these medical standards is to determine which drivers are at risk of sudden incapacitation, while driving and to provide evidence based guidance for decisions as to their fitness to drive, based on the risk of sudden incapacitation while driving. Operational Managers, Safety Officers and Medical Advisers should, when required, consult to determine if the risks and hazards of sudden incapacitation (which includes the dangers to the individual and those who may rescue him) require either no special medical standards, standards appropriate to car drivers or standards appropriate to large goods vehicle drivers.

As a guide:

- NC1 No specific assessment
- NC2 Meet Group 1 (car) licensing requirements
- NC3 Meet Group 2 (LGV) licensing requirements

Further Information

There should be close co-operation between the medical advisers and those providing confined space and breathing apparatus training. Workers, who pass a medical assessment, may have difficulty when faced with the reality of confined space work, for example wearing breathing apparatus in zero visibility. Alternatively, workers with medical doubts, for example borderline spirometry results, may demonstrate satisfactory performance on the training ground.

Obesity will be a factor in determining adequate cardiovascular and respiratory function. Workers with a body mass index (Weight in Kg divided by height in M squared) over 30 require careful assessment and those with a BMI over 35 will usually be unfit.

If there are weight limits imposed by the equipment, for example the safe working load of a rescue hoist, it is for the employer to provide details to the medical assessor.

The ability of a worker to pass through a restricted opening is best determined on the training ground rather than by the medical assessor's tape measure.

Some authorities suggest that anosmics (those without a sense of smell) should not undertake confined space work. However the smell threshold varies greatly between individuals and from day to day (for example due to a cold or blocked nose). This guidance is not a safe system of work (SSW) and it is up to employers to ensure an appropriate SSW is prepared for entry into confined spaces under their control.

SECTION 8. National Occupational Standards (NOS) and Qualifications for working in confined spaces.

8.1 This section specifies the competency standards to be met by those that;

- Working in low risk confined spaces
- Working in medium risk confined spaces
- Working in high risk confined spaces
- Overseeing work in confined spaces
- Emergency rescue and recovery of casualties from confined spaces

8.2 The Confined Spaces Regulations 1997 stipulate that training for work at confined spaces must be provided. The regulations however make no stipulations for the;

- content or duration of the training
- credentials of the training staff
- nature, type, suitability or quantity of equipment and facilities used by the training provider organisation.

8.3 The confined spaces training provider community has expanded significantly in recent years and offers widely differing levels of commitment to training, infrastructure, course design and resourcing.

8.4 The confined spaces training community supplies confined spaces training to many other organisations besides water companies.

8.5 It is considered inappropriate and impracticable for the water companies to vet confined spaces training providers as a means to achieving consistent and appropriate standards.

8.6 It is also considered inappropriate for water companies to assume responsibility for designing or specifying the training courses that shall be provided to contractors that will enter, supervise or provide emergency assistance at their confined spaces.

Organisations that wish to carry out assessment for qualification purposes will need to go through a process of becoming approved by one of the awarding bodies who offer these five qualifications. This will involve being able to demonstrate they have the necessary resources (as outlined in this document in appendix), have the necessary management and quality assurance systems in operation to carry out high quality assessment, and can support candidates through the assessment process.

8.7 The training process operates separately. Training providers would be expected to provide first rate training which enables candidates to become competent. The NOS embody the skill and knowledge requirements have been derived from Water

UKs assessment of the risks and hazards found in confined spaces at water company installations.

This outcomes based approach, is consistent with training industry best practice.

- 8.8 This flexible approach allows individual training providers to design develop and promote innovative and cost effective training solutions for their clients in an unrestricted commercial market. The qualifications are competence based.
- 8.9 All of these requirements are complimentary to the (CS Regulations 1997) and does not in any way replace them.
- 8.10 The provisions of this document in no way alters the responsibility of the employer to satisfy itself as to the suitability or otherwise of its chosen training provider.
- 8.11 All persons wishing to enter a water company confined space shall, after suitable training, take the appropriate assessments such that qualifications may be obtained and presented to clients as proof of post training competence.
- 8.12 Holders of the initial C&G and the new vocational qualifications shall be reassessed every three years following refresher training as appropriate and a new certificate of post training competence shall be awarded to successful candidates.
- 8.13 Those that hold current valid evidence of the confined spaces training they have received, but no proof of competence qualification from C & G may continue to be permitted, at the discretion of the water company (and in accord with **section 8.24**), to make NC entries until the third anniversary of their training certificate or 1st January 2007 which ever is the sooner (after which proof of competence via a specified qualification will be mandatory) **See Appendix 3**
- 8.14 At the discretion of the client water company, to 1st January 2007 and only under the prescribed circumstance thereafter, no person shall be permitted to;
- i. Enter a confined space categorised NC1, NC2, NC3, NC4 unless they have been awarded and hold the appropriate and current competency based assessment qualification for the NC entry specified, **See Appendix 3**.

However, some visitors needing to gain access to sites involving NC entries may be permitted to enter at the discretion of the client provided that the visitor(s);

- receive a suitable site briefing from the supervisor/entry controller prior to any entry
- is always accompanied and under the direct supervision of a person that has been awarded and holds the appropriate and current competency based assessment qualification for the NC entry specified. **See Appendix 3**

- ii Supervise/manage NC2, NC3 or NC4 confined space entries unless they have been awarded and hold the current competency based assessment qualification for Supervision/Management. **See Appendix 3**
- iii Work as a Standby Rescue Team member unless they have been awarded and hold the current competency based assessment qualification for Standby Rescue Team Member. **See Appendix 3**

8.25 Proof, (by possession of the appropriate qualification(s))of having attained the appropriate post training competency standard will be requested by the client and will be **See Appendix 3**. Awarding bodies will award candidates who reach the required standard of post training competence a qualification and Certificate. Successful candidates shall register their achievement with the National Confined Space Database run on behalf of the Water Industry by Energy and Utility Skill. Water companies are able to access the database and verify details of current competency held by an individual as a part of their local strategy for ensuring only competent workers access their Confined Spaces. Details of the National Confined Space database is available from Energy and Utility Skills web page www.eusr.co.uk.

Details of approved assessment centre are available from Energy & Utility Skills and the awarding bodies.

8.26 Organisations wishing to become an approved assessment centre must apply to one of the awarding bodies who are accredited to award these five qualifications.

Acknowledgements

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- EUSkills for the great amount of time and investment in the production of this document;
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- HSE for its continued support and active contribution to the development of this OGN;
- Southern Water for contributing the final versions of the art work used in this OGN;
- City and Guilds etc
- Mines rescue etc

Appendix 1 Common Confined Space hazards at Water Company installations

TABLE 1.1 Non - exhaustive list of intrinsic hazards, which may be found in confined spaces - **Sewer Networks & Wastewater Treatment Works**

Generic Hazard	Specific Hazard	Common Effect	Principle Sources
Hydrogen Sulphide	Toxic/ Flammable	Poisoning Death	Breakdown of biological material. Digestion plant. Sewerage and pumping stations. Geological infiltration
Methane	Flammable/ Explosive.	Burns, Asphyxiation. Death	Breakdown of biological material. Digestion plant. Sewerage and pumping stations. Geological infiltration CHP units
Carbon Dioxide	Lack of breathable oxygen	Asphyxiation Death	Breakdown of biological material. Geological conditions. Contaminated land e.g Brick works, landfill sites, Digestion plant. Sewerage pumping stations.
Ammonia	Toxic.	Poisoning. Death	Breakdown of biological material. Digestion plant. Sewerage and pumping stations. Spillages
Chlorine	Toxic.	Poisoning. Death	Public baths. Industrial discharges
Cyanide	Toxic.	Poisoning. Death	Electro-plating industry discharges
Trichloroethylene and other industrial solvents	Toxic/Narcotic.	Asphyxiation. Poisoning. Death	Dry cleaners and industrial discharges

Generic Hazard	Specific Hazard	Common Effect	Principle Sources
Petrol	Flammable/ Explosion.	Burns Death	Forecourt spillage. Road traffic accidents
Mains gas	Explosion. Asphyxiation.	Burns Death	Gas pipeline failure
LPG	Explosion.	Burns Death	Stored gases.
Dust	Explosion.	Burns Death	Sludge dryers. Gasification plant
Plant & Equipment	Entrapment /crushing/ Abrasion	Physical injury	Flap valves Mechanically raked screens. Pumps
Temperature	Steam/Hot water	Scalding. Heat exhaustion Death	Laundries. Industrial discharges
Human/Animal/ Clinical waste	Infection	Ill health conditions	Exposure to biological agents. Abattoirs. Hospital waste, sharps/needles lodged in drains & pump blockages. Rats. Exposure to sewage
Oxygen deficient or displaced air	Asphyxiation.		Oxidation of ferrous metals. Oxidation of biological material. Large blood discharges from Abattoirs, Hospitals. Food waste
Chemical Exposure	Toxic Harmful Irritant Corrosive	Poisoning Corrosive burns.	Battery Manufacturers. Electro Spillages. discharges. Digestion plant. Splashes, sprays & aerosols
Liquids and solids moving in a solid state	Asphyxiation/ Drowning.	Suffocation Death	Tidal flows. Storm flows. Deep storage vessels. Silos. Large industrial waste discharges. Siphons. Bellmouth outlets at services reservoirs

Generic Hazard	Specific Hazard	Common Effect	Principle Sources
Physical Injury	Slips, trips, falls and impacts	Abrasion/bruising/ concussion/sprains & breaks.	Build up of fats. Projecting pipes and fittings. Ladders and steps. Open manholes and access points. Gantries and stairways.
Access and Egress	Restricted size	Entrapment	Manholes. Failure of ladders/step irons etc
Structural Instability	Collapse.	Crushing. Entrapment. Falling	Brick sewers. Corroded metal fittings.
Electricity	Electric shock	Burns. Death	Impacting on buried cables. Electrical equipment
<u>WWT Process Chemicals & Gases</u>			
Ferric Chloride	Irritant	Damage to skin and eyes	Sewage and sludge treatment works. Odour control units
Polyelectrolite	Dust Slippery when wet	Increased risk of slipping	High slip risk on batching and dosing plant.
Sodium Hypochlorite	Irritant. Corrosive	Chemical burns.	Disinfectant or sweetener on W.W. Treatment Plants
Oxygen Enrichment	Enhanced risk of fire.	Burns	Sewage and sludge treatment works. Manufactured and bulk stored oxygen for process applications eg C.O.A.S.T. plant. Prevention of septicity in rising mains. Hydrogen peroxide dosing

Table 1.2 Non - exhaustive list of introduced hazards, which may be found in confined spaces - **Sewerage Networks & Sewage Treatment Works.**

Generic Hazard	Specific Hazard	Common Effect	Sources
Gases, vapours, liquids and dust(s)			
Oxygen enrichment	Increased Fire risk	Burns.	Oxygen flame cutting.
Carbon Monoxide	Toxic	Asphyxiation Death	Internal combustion. Fire in or adjacent to space. Boilers.
Nitrogen	Lack of breathable oxygen	Asphyxiation Death	Inerting gas for purging sludge digesters
Electrical and electronic equipment	Igniting gases Electric shock	Burns. Death	Non explosion protected or flameproof equipment.
Exposure to chemical agents	Paint Sandblasting Epoxy resins, cement etc	Asphyxiation/ intoxication. Burns Dermatitis. Poisoning.	Repairing seals, walls etc. Painting
Mechanical	Physical injury. Fire	Abrasions Breaks Sprains Death	Percussive tools. Abrasive wheels. Cutting gear
Rat poison	Anti-coagulant attack on central nervous system	Ill health effect	Rodent control
Manual Handling	Bending Lifting Carrying	Physical injury.	Raising/lowering loads. Operating in restricted spaces. Lifting manhole covers

TABLE 1.3 Non - exhaustive list of intrinsic hazards, which may be found in confined spaces - **Water Supply & Distribution Networks**

Generic Hazard	Specific Hazard	Common Effect	Sources
Gases vapours liquids and dust(s)			
Methane	Explosive	Asphyxiation. Burns	Borehole strata. Geological condition. Breakdown of biological material at spring water sources. Sediments in storage reservoirs. Mains gas. Contaminated land e.g. Brick works, town gas works, rubbish tip
Carbon Monoxide	Toxic	Poisoning	Internal combustion engines. Boilers.
Chlorine	Toxic gas	Lung and skin burns. Death	Process Dosing plant. Sodium Hypochlorite dosing.
Sulphur Dioxide	Toxic gas	Lung and skin burns. Death	Process Dosing plant. Metabisulphate dosing plant
Ozone	Toxic gas	Death	Process Dosing plant.
Ammonia	Toxic/Flammable gas	Lung damage.	Compressed process gas
Radon	Carcinogenic	Lung cancer	Mine Adits. Granite strata
Asbestos Dust	Carcinogenic	Cancer	Asbestos mains cutting & Handling

Generic Hazard	Specific Hazard	Common Effect	Principle Sources
Asphyxiation	Low oxygen. Drowning	Drowsiness to death	Wells and Borehole head spaces. Geological conditions. Tanks, Reservoirs Vessels, Trenches. Sudden Large fractures in uPVC mains when drilling/tapping. Tanks/Reservoirs Vessels. Washdown outlet in service reservoirs.
Algal blooms	Toxic	Skin reactions. Ill health effects	Impounded water sources tunnels and pipes
Carbon Dioxide	Lack of breathable oxygen	Asphyxiation, Death	Contaminated land e.g Brick works, landfill sites
Physical Injury	Slips, trips, falls and impacts	Abrasion/ Bruising Concussion/sprains & breaks Slips trips and falls. Impacts	Ladders, wet surfaces. Projecting pipes and fittings
Electricity	Electric shock	Burns Death	Impacting on buried cables. Electrical equipment
Access and Egress	Restricted access	Entrapment. Collapse	Tanks/Reservoirs Vessels. Meter pits, valve chambers, booster-pumping stations. Trenches.

Table 1.4 Non - exhaustive list of introduced hazards, which may be found in confined spaces - **Water Supply & Distribution**

Generic Hazard	Specific Hazard	Common Effect	Sources
Carbon monoxide	Toxic	Poisoning	Vehicle exhaust. Petrol driven tools etc.
Carbon dioxide. Halon (BCF).	Lack of breathable oxygen	Asphyxiation. Death	Pipe freezing equipment. Fire damping systems
Styrene	Irritant Toxic	Irritation of eyes/ lungs. Tiredness/ slower reaction times.	Pipe relining work
Trichloroethylene and other solvents	Flammable/Highly Flammable. Causes respiratory sensation	Irritation of eyes/ lungs or skin. Unconsciousness/ Death. Increased risk of fire/explosion.	Butt fusion welding in trenches.
Interaction of chemicals used in water treatment process e.g. sulphuric acid/ Caustic soda/ soda ash , Hydrofluorosilicic acid etc.		Poisoning. Asphyxiation	Bulk storage of chemicals, uncontrolled delivery. Failure of pipework and storage vessels. Fluoridation plant
Flammable			
Oxygen enrichment	Enhanced risk of fire	Burns	Oxygas Flame cutting. Ozone process plant.
Hydrogen	<u>Explosion</u>	Burns Death	By-product of onsite electro chlorination oSEC
Electrical and Electronic Equipment	Igniting gases. Electric shock.	Burns. Death	Non-explosion protected or flameproof equipment
Exposure to chemical agents	Paint, Sandblasting Epoxy resins, cement etc	Asphyxiation/ intoxication. Burns Dermatitis. Poisoning.	Repairing seals, walls etc. Painting
Electricity	Electric shock	Burns. Death	Electrical equipment

Appendix 2 Equipment Specification for Entry to Confined Spaces in the Water Industry

The following denotes the level of equipment required for each entry classification. The categories medium and high risk encompass the 'overseeing work in confined spaces' and 'Emergency rescue and recovery of casualties from confined spaces' classification equipment requirements.

Low risk – (NC 1)

Equipment

- Personal Protective clothing eg overalls/waterproofs.
- Safety footwear
- Portable Gas monitor (capable of detecting low oxygen, flammable gas and appropriate toxic gases).
- Explosion protected light as required
- Travelling First Aid kit

Medium risk (NC 2)

Equipment

- Protective clothing as appropriate
- Safety footwear
- Portable Gas monitor (capable of detecting low oxygen, flammable gas and appropriate toxic gases).
- Explosion protected light as required
- Hand line for lowering detector, tools etc.
- First aid kit (1 to 5 or larger)
- Safety helmet
- Mechanical lifting device (Note; where a fully suspended decent is planned a secondary rescue system is required)
- Appropriate Harness
- Escape breathing apparatus for depths greater than 6 metres.
- Safety barriers road signs etc as appropriate
- Life jacket (Where necessary)
- Means for calling emergency services

Medium risk (NC 3)

Equipment

- Protective clothing as appropriate
- Safety footwear
- Portable Gas monitors to equip each and every entry team member (capable of detecting low oxygen, flammable gas and appropriate toxic gases.
- Explosion protected lights as required
- Hand line for lowering detector/tools
- First Aid kit (1 to 5 or larger)
- Safety helmets
- Mechanical lifting device for vertical entries (Note; where a fully suspended decent is planned, a secondary rescue system is required)
- Appropriate Harnesses
- Sufficient escape BA sets to equip each and every entry team member. Duration time of sets to provide adequate escape time
- Means to call emergency services
- Means of communication with members of the team
- Sufficient working/rescue BA sets to address the rescue arrangements (minimum of 2 sets)
- Safety barriers road signs etc as appropriate
- Life jacket (Where necessary)

High risk (NC 4)

Equipment

As for NC3 above plus specific equipment specified by the Safe System of Work. In addition to the personal and team equipment listed in NC3 above, consideration should be given to the following where applicable:

- Air movers/local exhaust ventilation
- Specific detectors, possibly involving continuous monitoring
- Means for locking off electrical/mechanical equipment
- Flame/spark proof tools and equipment
- Suitable respiratory protection for dust and sewage spray hazards
- Chemical resistant suits, gloves, eye protection and hearing protection

- Compressed or forced air feed breathing apparatus to address introduced or serious intrinsic chemical hazards
- Life jacket

Appendix 3 National Occupational Standards for working in confined spaces.

The National Occupational Standards indicated in this section were valid at the time of publication of this document. It recommended that reference is made to Energy & Utility Skills web page www.euskills.co.uk to ensure the latest edition is referred to.