Delivering Quality Potable Water to Offshore Installations

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1. Introduction

Drinking water must be 'wholesome', a term that is defined in law and measured against a set of defined standards set by national regulations. These standards are set to protect public health and the definition of wholesome reflects the importance of ensuring that water quality is acceptable to consumers.

Legislation, and the legal standards in the UK, is based upon those which are set in Europe in the Drinking Water Directive 1998 which are derived from the World Health Organisation in the Guidelines for Drinking-water Quality.

The supply of 'wholesome drinking water' (hereafter referred to as potable water) to offshore installations is the responsibility of a number of stakeholders including the supplier, charterer and carrier of the water.

Potable water for offshore installations, carried as cargo on offshore supply vessels, is intended for domestic purposes including, but not limited to, cooking, drinking, food preparation and washing.

The Offshore Installations and Pipeline Works (Management and Administration) Regulations (MAR) 1995 requires:

> *'The duty holder shall ensure that all provisions for consumption by persons on the offshore installation are fit for human consumption, palatable and of good quality.'*

L70 A guide to the Offshore Installations and Pipelines Works (Management and Administration) Regulations 1995 Guidance on Regulations states:

> *'Provisions include food and drink (including water). They should be nutritious, wholesome and safe to eat or drink. Arrangements should ensure that provisions meet these criteria when supplied and that they continue to do so while stored on the installation.'*

1.1. *Scope*

This document is applicable to vessels operating in the United Kingdom Continental Shelf (UKCS), but the principles can be applied elsewhere.

1.2. *Aim*

This document provides practical guidance on delivering quality potable water to offshore installations.

The maintenance of offshore installation hoses is not covered by these guidelines.

1.3. *Glossary of Terms*

Term	Definition
Biofilm	Complex microbial ecosystems consisting of microorganisms attached to a surface which may or may not be visible.
cfu	Colony Forming Unit
Chloramination	A means of disinfection used by some municipal water suppliers based on adding ammonia and chlorine individually that react to produce chloramine disinfectant.
Chlorination	The act of adding chlorine to water to maintain a sufficient concentration to ensure ongoing disinfection.
Chlorine	Combined Chlorine – when measured from a municipal source, this is the amount of stored chlorine that is 'inactive' in water until it is released over time through degradation. Free Chlorine – this is the 'active' chlorine in water available for treating bacteria. It is sometimes referred to as residual chlorine and is used to measure the disinfection strength of water which has been treated using chlorine based disinfection products. Total Chlorine – the total amount of chlorine in water including free and combined chlorine.
DWI	Drinking Water Inspectorate
GCMS	Gas Chromatography Mass Spectrometry
ISM	International Management Code for the Safe Operation of Ships and for Pollution Prevention
NUI	Normally Unattended Installation
PPB	Parts Per Billion
PPM	Parts Per Million
TVC	Total Viable Count
THC	Total Hydrocarbon Content (within water)
UK	United Kingdom
UKCS	United Kingdom Continental Shelf
WHO	World Health Organisation
Wholesomeness	As defined in The Water Supply (Water Quality) Regulations 2000 & The Water Supply (Water Quality) (Scotland) Regulations 2001
WRAS	Water Regulations Advisory Scheme

Table 1: Glossary of Terms

2. Background Information

Revision 1 of the Guidelines for the Carriage of Potable Water for Supply to Offshore Locations required updating to reflect improvements in industry practice. Revision 2 (this document) has been re-named 'Delivering Quality Potable Water to Offshore Installations' to better reflect the intent of the document.

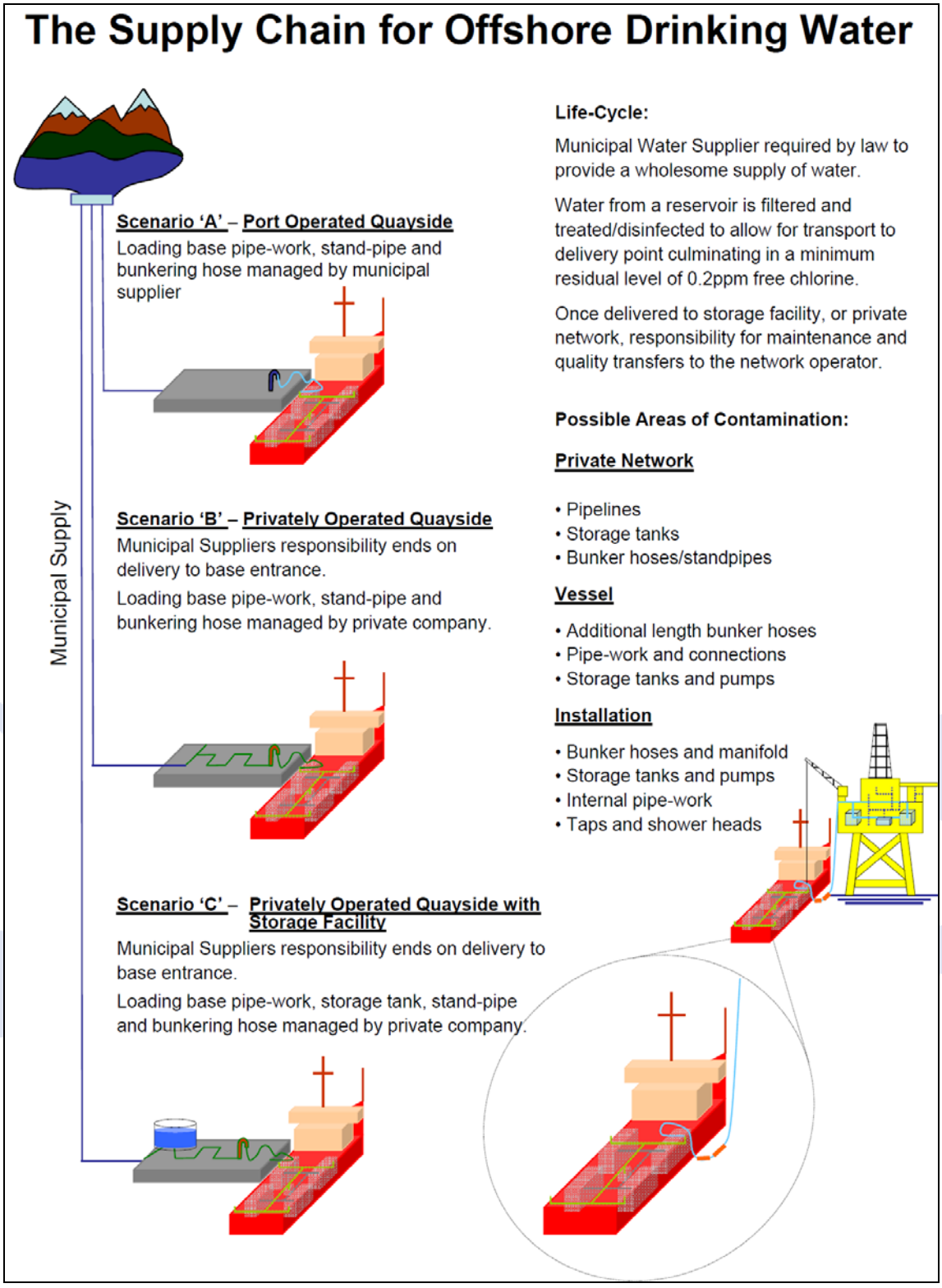
For the purposes of this document, it is accepted that water delivered to stand pipes or private networks from the municipal water supply in the United Kingdom (UK) is of a wholesome quality given the municipal supplier's legal duty of care.

Figure 1 provides an overview of the supply chain of potable water to offshore installations and the potential areas of contamination.

Where there is a risk of contamination, control measures are required to minimise this risk. Sections 3 & 4 are structured to reflect the steps in the supply chain where control measures will be applicable. Control measures include, but are not limited to:

- Management
- Maintenance
- Treatment
- Monitoring

Figure 1: Potable Water Supply Chain



3. Shore-side

Any privately owned tanks, standpipes, hoses or pipework downstream of the municipal supply (Scenario B and Scenario C in Figure 1) are not under the direct control of the municipal supplier. They are the responsibility of the onshore owner/operator of that site.

3.1. *Storage Tanks*

3.1.1. Design and Construction

Shore-side storage tanks should be constructed with Water Regulations Advisory Scheme (WRAS) approved materials and components and be designed so that they have suitable access for inspection and maintenance.

3.1.2. Management and Maintenance

Those responsible for storage tanks should ensure a regular turn-over of water to avoid stagnation. They must also be able to demonstrate that the hygienic condition of the tanks is checked by annual inspection. Where these parameters are not met, cleaning and disinfection must take place. Any repairs or parts replaced must use WRAS approved materials and components.

3.1.3. Treatment

The free chlorine concentrations in water must be maintained above 0.2ppm at the point of delivery to the vessel.

3.1.4. Monitoring

Daily chlorine measurement, quarterly microbial and chemical sampling (see Section 6) and annual inspections to check for coating breakdown, rust, deposits or organic growth are required. If sample results or inspections suggest problems with water quality remedial actions must be taken.

3.1.5. Records

A water management plan must be developed to include, as a minimum, maintenance schedules, inspection and cleaning routines, water treatment methods, sampling and testing frequency and results. These records should be readily available for periodic audit and be retained for a period of 3 years.

3.2. *Stand Pipes and Delivery Hoses*

3.2.1. Management

Dedicated stand pipes used for the delivery of water to vessels should be treated as part of the hose and managed as detailed below.

Stand pipes must be properly capped or covered to minimise contamination.

Only dedicated uniquely identified potable water hoses should be used for the transfer of potable water. When not in use, all water-bunkering hoses must be properly capped and stored in such a way as to avoid contamination. End caps must be inspected, cleaned and replaced is required.

Before delivering water to a vessel, the stand pipe and hoses must be flushed for 2 minutes.

3.2.2. Maintenance

Stand pipes and hoses must be inspected before each use and replaced when no longer fit for purpose. Fittings should be clean, tight-fitting and leak free.

Only WRAS approved food-grade lubricants should be used in the maintenance of stand pipes and potable water hoses. Contamination with hydrocarbons has been known to occur when non-WRAS lubricants have been used.

3.2.3. Treatment

Before use, all stand pipes and hoses must be inspected and any found to be uncapped or uncovered must be disinfected.

On a weekly basis, stand pipes and hoses should be disinfected with a 50ppm chlorine solution for one hour and then flushed with water for 2 minutes prior to the hose being connected to the vessel.

3.2.4. Monitoring

There are no specific monitoring requirements.

3.2.5. Records

A stand pipe and hose equipment register must be maintained to record the weekly disinfection and equipment maintenance, including change-out. All equipment must be uniquely identified. Records should be retained for a period of 3 years.

4. Vessels

4.1. *Storage Tanks*

4.1.1. Management

Storage tanks, used for transporting potable water, must be dedicated solely for that purpose. Efforts should be made to minimise the storage duration of water in any tank to avoid stagnation. Good practice would be to dispose of all water in such tanks after 14 days continuous storage.

4.1.2. Maintenance

Maintenance required for potable water storage tanks should be in the vessel planned maintenance system and audited under the International Safety Management (ISM) Code.

The planned maintenance system must cover scheduling and scope of inspections, tank fabric maintenance, cleaning and disinfection routines on board.

Internal visual inspection of potable tanks, and thorough cleaning, must be carried out on an annual basis. Where contamination, sediment, deposits and damaged/worn coatings are identified, minimum corrective actions must be taken as detailed below:

- Physically clean tanks to remove contamination such as biofilm, sediment and debris.
- Touch-up tank coatings as necessary if inspections highlight any damage. Coating should be applied to manufacturer's recommendations and guidelines. Care must be taken to ensure effective curing of tank coatings before the tank is returned to use. Coatings must be specifically designed and approved for potable water.
- Following any intrusive maintenance such as the above, full tank disinfection using super chlorination, or any other approved method, to remove biofilm, clean and disinfect the tank, is required. All tank surfaces and distribution pipework and manifolds should be treated (see Appendix 2 Super Chlorination Procedure).

In addition, Vessel Owners/Managers should plan to undertake preventative maintenance including thorough cleaning and disinfection, and re-coating where necessary, of all potable water tankage within their dry-dock cycle.

Consideration should be given to the provision of dedicated sample points on each potable water tank for new build vessels. Design should be such as to allow thorough disinfection of the sampling point.

4.1.3. Treatment

Following intrusive maintenance or where water quality tests have identified contamination, super chlorination, or other approved means of disinfection, is required to disinfect the tank surfaces.

4.1.4. Monitoring

If on-going routine test results, or other observations, suggest that water quality is deteriorating, additional tank monitoring activities must be undertaken; this may include additional internal tank inspections, cleaning and disinfection.

4.1.5. Records

Planned maintenance routines and records must be kept up-to-date and include comprehensive details of the work carried out and outcome. Consideration should be given to keeping photographic records to support the written report. Records should be retained for a period of 3 years.

4.2. *Pipework / Manifolds*

4.2.1. Management

These should be treated in a similar way as tanks, with annual inspections to ensure cleanliness and integrity.

4.2.2. Maintenance

Manifolds and caps should be inspected before and after use. Threads are to be kept clean and lubricated using a WRAS approved food-grade lubricant only.

All valves are to be operational and kept closed when not in use.

4.2.3. Treatment

Pipework and manifolds will be disinfected at the same time as every tank treatment. As a minimum, this must be carried out annually.

4.2.4. Monitoring

When water quality problems are identified, manifolds and pipework should be included in any corrective action.

4.2.5. Records

Planned maintenance routines and records must be kept up-to-date and include comprehensive details of the work carried out and outcome. Consideration should be given to keeping photographic records to support the written report. Records should be retained for a period of 3 years.

4.3. *Hoses*

Where vessels provide their own hoses the following sections apply.

4.3.1. Management

Only dedicated, uniquely identifiable, potable water hoses should be used for the transfer of potable water. When not in use, all water-bunkering hoses must be properly capped and stored in such a way as to avoid contamination. End caps must be inspected, cleaned and replaced if required.

4.3.2. Maintenance

Hoses must be inspected before use and replaced when no longer fit for purpose. Fittings should be clean, tight-fitting and leak free.

Only WRAS approved food-grade lubricants should be used.

4.3.3. Treatment

All hoses must be inspected before use. When a hose has not been used for 14 days or more it should be disinfected with a 50ppm chlorine solution for one hour and then flushed with water for 2 minutes prior to use.

4.3.4. Monitoring

There are no specific monitoring requirements.

4.3.5. Records

A hose register should be maintained which would record any disinfection and equipment maintenance including change-out. All equipment must be uniquely identified. Records should be retained for a period of 3 years.

5. Operations

This section considers the process of bunkering and transporting potable water to offshore installations

5.1. *Chartering*

When hiring a vessel to transport potable water, Charterers should specify that vessel owners / operators provide evidence that the water carried in each of their tanks has been subject to quarterly testing with satisfactory results being achieved with regard to water quality.

Vessel owners / operators are expected to maintain evidence of this and may be required to provide this information upon request.

Failure to provide such information may affect the suitability for charter of the vessel.

5.2. *Water Quality*

It is accepted that water delivered to stand pipes or private networks from the municipal water supply in the United Kingdom (UK) is of a wholesome quality given the municipal supplier's legal obligations.

Where water is supplied from a privately owned tank and pipework system, the storage tank / network operator must be able to provide the vessel with documentary evidence that the water disinfection at the point of delivery is being maintained above 0.2ppm free chlorine (or an equivalent via a slow-release system such as Chloramination).

Where this evidence cannot be provided, the vessel owner / operator should refuse to bunker the water and refer the matter to the Charterer.

5.3. *Preventing Stagnation*

To manage the risk of stagnation (and therefore bacterial growth), Charterers should, as far as possible, instruct vessel owners / operators to completely empty their tanks prior to re-filling. Charterers should plan to bunker sufficient water to meet their needs rather than have water sitting in the vessel tanks for prolonged periods.

Consideration should be given to disposal of water after an extended period of storage on-board. Good practice suggests disposal after a period of 14 days.

Storage time may be extended by on-going chlorine additions to maintain a concentration of above 0.2ppm free chlorine which is particularly appropriate for vessels that have prolonged periods between port visits.

5.4. *Bunkering Shore to Vessel*

Shore-side and vessel manifolds should be cleaned prior to use using a disinfectant spray or wipes. The personnel involved should wear clean unused disposable gloves for this operation.

For loading water onto a vessel, shore side personnel must flush the distribution pipework, stand pipe and hose for at least 2 minutes before connecting the hose to the vessel. Where long or complex pipework is involved the duration of flushing should be longer.

To be competent to undertake the above tasks, personnel must receive adequate information, instruction and training.

5.5. *Vessel to Installation*

The installation must prepare hoses used for the transfer of potable water in line with the requirements of current industry guidance for offshore marine operations.

Wherever possible, potable water should be sampled and analysed by the vessel or installation crew prior to the bunkering operation to confirm that the water contains above 0.2ppm free chlorine.

If the installation decides to take the water they can disinfect during bunkering to achieve at least the required level in the installations storage tanks prior to use.

5.6. *Intermediate Bulk Containers*

Intermediate Bulk Containers (IBCs) are often used to support projects where larger volumes of potable water are needed than is held on the installation e.g. a Normally Unattended Installations (NUI's).

IBC's are carried as deck cargo and should come with certification stating they are food grade quality, dedicated only for potable water transportation and have transit log with WRAS or equivalent verification of water suitability.

IBC's with no clear history, or any evidence of non-food / chemical use that state on the manifest potable water, must be rejected as unsuitable.

Suppliers of IBC's must ensure they use only dedicated potable water tanks and containers for the filling and transportation of potable water. Tanks that have been used for different cargoes previously are not suitable for the carriage of potable water, but may only be used to carry fresh water not intended for-human consumption.

Management and operation of IBC's used for the carriage of potable water should follow the guiding principles contained within this document.

6. Quarterly Microbiological and Chemical Tests

This section details the recommended quarterly analysis of potable water by an independent third party - samples should be taken from all tanks. These tests provide a record of good tank and potable water management and can assist Duty Holder's in meeting their regulatory obligations.

Laboratories undertaking these tests should be accredited by the relevant body – for the United Kingdom, this is the United Kingdom Accreditation Service (UKAS).

6.1. *Microbiological Tests*

6.1.1. Coliforms/ E.Coli / Enterococci

Legislative limit is 0 counts per 100ml.

Testing for the presence of these faecal indicator organisms provides the most sensitive and specific way of assessing the microbiological quality of potable water because reliable indicators are not available for many other pathogens. Frequent testing for E.Coli, Enterococci and coliforms, is essential for checking water quality and thus helping to protect the health of the offshore workforce.

6.1.2. Total Viable Count

The total number of colonies is referred to as Total Viable Count (TVC) and is calculated as the counted number of colonies multiplied by the dilution used for the test. TVC is reported using colony forming units per millilitre (cfu/ml) and provides a broad measure of the microbiological activity in a given sample. For an indication of the general condition of the water, the TVC will be measured at 22^{o}C and 37^{o}C on each sample.

The original guideline for acceptable levels of bacterial contamination in mains/drinking water was laid down by the World Health Organisation (WHO) to be no more than 100cfu/ml at 22^{o}C and 10cfu/ml at 37^{o}C. WHO now consider this to be un-realistic. In the UKCS, a workable limit of 300cfu/ml at 22^{o}C and 100cfu/ml at 37^{o}C is regarded as acceptable.

6.1.3. Legionella

Legislative limit is <100 cfu/l.

Well maintained water tanks, pipe work, pumps and hoses, along with good water management practices can help control the legionella bacteria.

Although testing for Legionella is not a requirement for potable water, it is important to understand that Legionella is a potential source of contamination.

The danger of infection caused by Legionella bacteria is caused when it gains entry to the respiratory system. This can occur from water suspended in air in the form of a fine mist as created by showers or tap sprays.

6.2. *Chemical Tests*

6.2.1. Hydrocarbons

The potable water supply should contain nil hydrocarbons

Testing for hydrocarbons has historically been carried out due to the potential for cross contamination from poor design of vessel pipework systems and commonality of transfer hose connections. Improvements to ship design and use of hydrocarbon-specific hose

connections has contributed to a reduction in instances of hydrocarbon contamination of potable water.

Less than 10ppb is the stated limit value as this is generally the limit of detection. The test should take the form of a Gas Chromatography Mass Spectrometry (GCMS) screen and at the least should cover contaminants in the range C_8-C_{40}.

6.2.2. Chlorides

Legislative limits <250 mgCl/l

Testing for chlorides is required due to the potential for contamination with sea water. The test can be carried out using an electronic meter, reagent kit or via a lab analysed sample.

Bacteriological / Chemical Quality Guidance		
Required Test	**Acceptable Limit**	**Action to Take If Result Exceeds Limit**
Chlorides	<250mgCl/l	Quarantine tank(s), do not discharge to installation(s) or use and investigate the source of contamination. If water has been discharged, advise the installation(s). Tank should not be used until an acceptable result has been obtained.
Coliforms	0/100ml	Quarantine tank(s), do not discharge to installation(s) or use and investigate the source of contamination. If water has been discharged, advise the installation(s). Tank should not be used until an acceptable result has been obtained.
E.coli	0/100ml	Quarantine tank(s), do not discharge to installation(s) or use and investigate the source of contamination. If water has been discharged, advise the installation(s). Tank should not be used until an acceptable result has been obtained.
Enterococci	0/100ml	Quarantine tank(s), do not discharge to installation(s) or use and investigate the source of contamination. If water has been discharged, advise the installation(s). Tank should not be used until an acceptable result has been obtained.
Hydrocarbons	<10 ppb	Quarantine tank(s), do not discharge to installation(s) or use and investigate the source of contamination. If water has been discharged, advise the installation(s). Tank should not be used until an acceptable result has been obtained.

Bacteriological / Chemical Quality Guidance		
Required Test	**Acceptable Limit**	**Action to Take If Result Exceeds Limit**
Iron	<200mg/ltr	Quarantine tank(s), do not discharge to installation(s) or use and investigate the source of contamination. If water has been discharged, advise the installation(s). Tank should not be used until an acceptable result has been obtained.
Legionella	<100 cfu/Litre	100 or less cfu/Litre **Review programme operation** - A review of the control measures and risk assessment should be carried out to identify any remedial actions and the count should be confirmed by immediate resampling.
		100 or l000 cfu/Litre **Review programme operation** - A review of the control measures and risk assessment should be carried out to identify any remedial actions and the count should be confirmed by immediate resampling.
		>l000 cfu/Litre **Implement corrective action** - The system should immediately be re-sampled. It should then be 'shot dosed' with an appropriate biocide, as a precaution. The risk assessment and control measures should be reviewed to identify remedial actions.
TVC	<300cfu/ml @ 22°C	Seek advice
	<100cfu/ml @ 37°C	

Table 2: Bacteriological / Chemical Quality Guidance

Appendix 1 - Sampling Protocol

Incorrect sampling technique is the most common cause of sample failure. This section provides guidance on procedures to reduce cross contamination risks and should be followed.

Where practicable, sampling should be carried out in port to enable timely dispatch of samples to the laboratory. Where there is a need to take samples whilst the vessel is at sea these should be dispatched by the most expedient means possible.

Summary of Method

This method provides a procedure for the collection of potable water for microbiological, chemical and hydrocarbon analysis from Offshore Support Vessels. It is based on BS EN ISO 5667-3:2012 Water Quality – Sampling - Preservation and Handling of Water Samples.

A known volume of water is collected from either the bunker line or directly from storage tank sample points. Sufficient time should be allowed for adequate flushing of pipe lines and potable water tank sample points before sample collection - a minimum of 2 minutes is recommended. The sample should be transported to the laboratory for testing within 6 hours (or 24 hours if the samples can be stored under refrigerated conditions).

Apparatus

The laboratory undertaking these tests will normally supply the required apparatus. In the event that sampling is carried out by others, the following should be obtained:

- Clean disposable gloves, if none, then hands should be washed.
- Sodium hypochlorite solution / disinfectant wipes.
- Sealed, sterile sample bottle for microbiological tests – a sterile bottle containing 3% thiosulphate. This may be in the form of a powder or solution and may appear as small droplets or white spots on the inside of the sample bottle. If the seal on a sample bottle is broken then do not use.
- 1L sealed, sterile sample bottle per legionella test.
- Appropriate Trichloroethylene (TCE) or Dichloromethane (DCM) washed 1L hydrocarbon glass bottles.
- Appropriate chemistry sample bottle.
- Form for recording sample information.

Procedure

1. Before sampling, ensure that sufficient bottles have been prepared. Label the bottle, stating location, tank number, name of person taking the sample, date and time of sample.
2. Ensure that the discharge end of the line / sample point is free from physical debris. If debris is detected, wipe around the end with disinfectant wipes, alternatively use sodium hypochlorite solution if available.
3. Start the pump / open the sample point and allow the water to flush through for 2 minutes. If the tank being sampled is at the extremities of the vessel, allow a longer flushing time.
4. If sampling from the discharge line the water will be pumped with considerable force and personnel should take up position clear of the discharge line.

5. For each sample bottle:
    a. Ensure that the sample point is free from oily residue.
    b. Remove the cap from the sample bottle, taking care not to touch the inside of the cap or the neck of the bottle. Do not put the cap down.
    c. Fill the bottle completely, without rinsing, by holding it in the stream of water – do not overfill. Replace the cap tightly.
6. During the sampling procedure, check for particulate material, discolouration and discernible odours and report any observations on the sampling record sheet. Make a note of the last date of bunkering.
7. Collect information regarding maintenance of the potable water tanks i.e. have they been inspected, painted recently, contaminated etc. This information should be recorded on the sampling record sheet which should be sent with the samples. It is strongly recommended that the vessel take a copy of this for their records as this may be required as evidence should contamination take place offshore.
8. Transport samples to laboratory for analysis.

Appendix 2 – Super Chlorination Procedure

Super-chlorination is carried-out following intrusive tank maintenance. It can also be used as a reactive measure when a tank has failed a microbiological test.

Where possible, super-chlorination should be carried out in port. Planning for the task enables sufficient quantities of the required disinfectant to be ordered and delivered to the vessel for use. It is recommended that excess quantities of disinfectant should be returned to the supplier rather than stored on the vessel.

In order to achieve 50ppm (50mg/l) disinfectant in solution, refer to the product specific information sheet(s) (this is not the same as the Safety Data Sheet (SDS)) supplied with the disinfectant which should contain an example calculation e.g. using a 10% stock solution 5 litres is required per 10 tonnes of water.

For disinfection using sodium hypochlorite, the following calculation can be used:

1. Determine the volume of water necessary to fill the tank(s) and distribution system completely and the amount of sodium hypochlorite required.
2. Calculate the amount of sodium hypochlorite required to produce a 50ppm (50mg/l) solution in this volume. This can be achieved by using reference tables or online calculators or by using the following:

$$\text{Volume of Sodium Hypochlorite (L)} = \frac{\text{Target Free Chlorine (ppm)}}{\text{\% Activity x 10,000}} \times \text{Total Volume of Water}$$

Procedure

1. Introduce the disinfectant into the tank. This is best done into a tank which is less than half full so that the turbulence of the incoming water ensures adequate mixing. Fill the tank to overflowing to enable all surfaces to come into contact with sterilising solution.
2. Where possible, use high-range chlorine test strips (or other means), to check that a minimum concentration of 50ppm is being maintained. Testing could be carried out at sample cocks or at the discharge line. Follow the manufacturer's instructions.
3. The disinfected water at 50ppm should be allowed to remain in the whole system for at least 1 hour.
4. Super-chlorinated water should be discharged in line with local by-laws.
5. Tank(s) should be filled and emptied until a concentration of 0.2ppm to 0.5ppm has been obtained.

Appendix 3 – References

1. Offshore Installations and Pipeline Works (Management and Administration) Regulations (MAR) 1995
2. L70 A guide to the Offshore Installations and Pipelines Works (Management and Administration) Regulations 1995 Guidance on Regulations
3. Guidelines for Drinking-quality Water, World Health Organization
4. The Water Supply (Water Quality) Regulations 2000
5. The Water Supply (Water Quality) (Scotland) Regulations 2001
6. Legionellosis Risk Management and Legionella Control – Guidance for Oil and Gas Facilities, Offshore Platforms and Refineries – Energy Institute
7. Water Fitting & Materials Directory – WRAS
8. Guidance on the Water Quality Aspects of Common Carriage – DWI
9. Tankering of Potable Treated Water Supplies – Scottish Water
10. BS EN ISO 5667-3:2012 Water quality. Sampling. Preservation and handling of water samples.

Appendix 4 – List of Contributors

Apache North Sea
ASCo
BP Exploration and Production
C-CHEC
Chevron Upstream Europe
CNR International
ConocoPhillips UK
Cunnart Solutions
Epsco
Gulf Offshore North Sea
Intertek
Maersk Oil North Sea UK
Marine Safety Forum
Myklebusthaug
North Star Shipping
Offshore Water Management
Oil and Gas UK
Petrofac Facilities Management
Scottish Water
Seacor Marine
Shell Exploration and Production
Total E&P UK
Transocean Drilling
UK Chamber of Shipping

Appendix 5 – Audit Pro-forma

The following form is a generic example of topics/issues that should be considered when auditing the potable water supply chain. It is highly recommended that Duty Holders develop their own audit documentation tailored to their particular circumstances. This form has merely been designed as a prompt to encourage a minimum level of scrutiny in the audit process.

	Potable Water Systems Audit						
	Auditor Name						
	Auditor Employer						
	Auditor Contact Details						
	Company Commissioning Audit						
	Company Focal Point						
	Company Contact Details						
	Date of Audit						
	Name of Entity Being Audited						
	Type of Entity Being Audited						
	Responsible Entity Operator						
	Location of Audit						
	Name of Auditee						
Sections being Completed:		**1**		**2**		**3**	

Audit Sample Questionnaire		**Satisfactory**		
		Yes	**No**	**N/A**
1	**Shore-side Potable Water Loading Base**			
	Is the water supplied direct to the quayside by the municipal supplier?			
	Is the base provider responsible for loading water?			
	Is the water supplied to the quayside via a storage tank?			
	Does the supplier have written records proving presence and effective use of a planned maintenance regime covering all components and tankage?			
	Is the storage tank in apparent good condition and sealed?			
	Is the water throughput of the storage tank sufficient to prevent			

	stagnation of supply?			
	Is the quayside delivery manifold clean, debris-free and well maintained?			
	Is the quayside delivery manifold flushed with water prior to connection of the standpipe?			
	Is the standpipe kept in a safe clean environment?			
	Is the standpipe capped/covered at each end?			
	Is the standpipe uniquely identifiable?			
	Is the standpipe marked as being 'solely for use with potable water'?			
	Is the standpipe clean looking and well maintained?			
	Is the standpipe disinfected before use?			
	Is water flushed through the standpipe for at least 2 minutes before connection of the hose?			
	Is the pot water hose kept in a safe clean environment?			
	Is the pot water hose capped/covered at each end?			
	Is the pot water hose uniquely identifiable?			
	Is the pot water hose clean looking and well maintained?			
	Is the pot water hose disinfected before use?			
	Is the pot water hose marked as being 'solely for use with potable water'?			
	Is water flushed through the pot water hose for at least 2 minutes before connection to the vessels manifold?			
	Are all connections free from toxic hydrocarbon based lubricants?			
	Have those involved in bunkering water received training commensurate with their duties.			
	Does the suppliers representative wear clean clothing and clean new disposable gloves?			
	Were samples taken of the water prior to delivery?			
	Did the water sample smell clean/free of odours?			
	Did the water sample look clean, bright and clear?			

Audit Sample Questionnaire		**Satisfactory**		
		Yes	**No**	**N/A**
2	**Vessel Used to Carry Potable Water Offshore**			
	Does the vessel have a **dedicated** cargo potable water tankage			

	and pipework system?			
	Are all potable water manifolds clearly identifiable as being solely for potable water?			
	Are all potable water manifolds clean and well maintained?			
	Are all potable water manifolds free from toxic hydrocarbon based lubricants?			
	Does the vessel have a valid certificate showing acceptable analysis results from within the past 3 months?			
	Are there test kits on board to measure free chlorine levels?			
	Does the vessel flush its potable water lines prior to connection of the loading water hose?			
	Does the vessel take samples of the water being loaded?			
	Does the vessel have written records proving the presence and effective use of a planned maintenance regime covering tankage, pipework and manifolds?			
	Does the vessel have one person responsible for the maintenance and certification of the potable water system?			
	Are the storage tanks inspected annually?			
	Are the storage tanks inspected and/or repaired during dry-docks?			
	Are there sample points available for each tank?			
	Is there a safe means of adding disinfectant to each storage tank once loaded?			
	Are the storage tanks super-chlorinated after intrusive tank maintenance?			
	Does the Charterer/purchaser of potable water have requirements to dispose of the water after a specified time period?			
	Enter charterers maximum stated period of retention of potable water.		days	
	Does the vessel have records of date and place of loading of each storage tank of potable water?			
	Does the vessel have instructions/procedures for how to introduce disinfectant to potable water tanks?			
	Does the vessel carry stocks of clean new disposable gloves and protective clothing/footwear?			
	Does the vessel carry stocks of food grade lubricants?			
	Does the vessel flush its potable water discharge lines for at least 2 minutes prior to connecting the installations hose?			

Audit Sample Questionnaire		Satisfactory		
		Yes	No	N/A
3	**Potable Water Management on Offshore Installations**			
	Does the installation have a **dedicated** potable water tankage and pipework system?			
	Does the installation have one person responsible for the maintenance and certification of the potable water system?			
	Does the installation have written records proving the presence and effective use of a planned maintenance regime covering tankage, pipework and manifolds?			
	Are the storage tanks inspected annually?			
	Are the storage tanks super-chlorinated after intrusive tank maintenance?			
	Are there test kits on board to measure potable water quality?			
	Does the installation take regular potable water samples to measure potable water quality?			
	Are all potable water manifolds clearly identifiable as being solely for potable water?			
	Are all potable water manifolds clean and well maintained?			
	Are all potable water manifolds free from toxic hydrocarbon based lubricants?			
	Does the installation carry stocks of clean new disposable gloves and protective clothing/footwear?			
	Does the installation vessel carry stocks of food grade lubricants?			
	Does the installation flush through its potable water lines for at least 2 minutes prior to loading into its storage tanks?			
	Can the installation demonstrate that it has maintained disinfection levels between 0.2ppm and 0.5ppm over a prolonged period of time?			
	Are the internal domestic pipework systems in good condition?			
	Is the internal domestic pipework system well designed and free of dead-legs where no through-flow is possible?			
	Are shower heads de-scaled/disinfected and taps disinfected regularly?			
	Are air-conditioning systems disinfected regularly?			
	Are calorifiers cleaned regularly if applicable?			