DO YOU DRINK THE WATER OFFSHORE

Russell Caldwell, Director and Head Consultant at Offshore Water Management, describes six elements that are integral to an affective water management programme.

When at home, whether taking a shower or simply making a cup of tea the majority of people don't give it a second thought. People take it for granted that the water they are using is safe. Is this same confidence displayed in the offshore workplaces? Is the water safe on your asset?

All employers, including those offshore, should be well aware of their duties regarding the welfare of their employees. Although different regions may have different customs and practices, when it comes to water there are two global rules: firstly employers must provide water fit for purpose and secondly they must be able to demonstrate this. Sounds simple but how many of us are confident that this is actually the case. Most of us will be aware of times where water quality has caused problems offshore. From a bad taste or smell to actual contamination, the interruption to operations can be significant. Emergency measures, quarantining tanks and de-manning personnel are all scenarios that have come about from poor water management. Not forgetting the real health and safety risks that can rise from poor quality water. A recent offshore Legionnaires disease case should reminds us all that water quality should not be taken lightly.

It's not all doom and gloom though. Serious problems are scarce and most offshore locations will have some measures of control in place. A site may incorporate a UV unit onboard, carry out a temperature control regime or perhaps use one of the many chemical disinfection techniques available. With the use of such controls, companies go a long way to achieving safe water. However it is not the complete story. Treatment control on its own is no guarantee of good water. In order to "demonstrate a sites water is fit for purpose" a satisfactory water management programme will have to be put in place. Although differing from site to site an affective water management programme will include, in some shape or form, the six elements described below.

Responsibilities and competencies

Whatever the task, all those involved in the management programme should understand their responsibilities. Although the overall responsible person will normally be the platform OIM or vessel master, there will be a number of additional personnel involved. Whether it's the medic, EHS advisor or an external consultant all should be fully aware of their responsibilities. Many incidents associated with mismanagement of water derive from individuals not understanding their roles. As well as understanding their roles they also have to be able to carry them out. They should have the time, resources and most importantly the competency to carry out their tasks. In most cases competency will simply be ensuring they understand and follow defined procedures but for some this will require specific training.

Assessing the risk

Clearly a very important part of any programme, the risk has to be identified in order to initiate the control procedures. Many sites will involve an external consultant to help initiate the assessment correctly and completely, however if carrying this out in-house there are two main differences between offshore and onshore water. Both will have a major impact on the risk. Offshore water does not come direct from the mains supply (one would be surprised how often this

concept is not understood) and the holding time offshore is much greater than onshore. These two differences alone make the risk of contamination more likely and therefore one would predict greater controls measures should be in place offshore than on.

Control

Probably the most documented element of the six, everyone has some understanding of the control measures available. The suitability of these will be down to factors best recognised by site personnel themselves. The choice of controls will come mainly from the original assessment, however site specific constraints such as available space, personnel, urgency and fund availability will all have an impact on the final decision. However there some standard pros and cons for each option that should be taken into account when making the choice (Table1).

Technique	Advantages	Disadvantages
chlorine	- cost - ease of application	- no effect on biofilm* - activity reduced at ph >8
U.V.	- no chemicals - low maintenance	- no residual disinfection** - no effect on biofilm
bromine	- ease of application - works at a wider range of pH	- no effect on biofilm
chlorine dioxide	- effective on biofilm	- capital cost - ongoing cost
thermal	- most effective method - effective on biofilm	- implementation - scalding risk
silver copper ionisation	- effective on biofilm - reduce harmful by-products	- capital cost - maintenance
ozone	- effective over wide range of pH and temperature - reduce harmful by-products	- no residual disinfection - no effect on biofilm

* Biofilm is normally a thin film layer found on internal water surfaces made up of microbial communities that can include bacteria that are harmful to humans
** Residual disinfection is when disinfection continues after the point of application and in water systems wherever the water flows.

As well as the main control strategy, there are a number of additional measures that can be put in place to minimise the risk. If bunkering, ensure the source of the water and its quality are known. If the site produces its own water then ensure that all equipment is working as specified by the supplier and within the operational parameters. The site should also look to control temperature within both the hot and cold water domestic systems. Although not always possible, cold should be less than 20 ˚C and hot above 60 ˚C. This will minimise the growth of any harmful bacteria that may enter the system. Controlling deadlegs and all other areas where water is able to remain stagnant will also reduce the risk of microbial growth. This would normally be controlled by initiating a simple flushing regime. Other measures such as inspection and cleaning should also be included. Overall there may be several levels of control in place ideally complimenting each other. Although in order to see if they are working, monitoring is required.

Monitoring

Regardless of how complete and robust the control measures are there is always the opportunity for failure. This could be due to equipment failure, system changes or simple human error. It is therefore important that companies have a monitoring regime to tell them when things are right and also when they are not. In addition, a good monitoring programme provides confidence in the control measures. It also helps us understand the controls better ultimately allowing for the possibility to increase their efficiency and effectiveness. Types of monitoring will come under two areas: monitoring to ensure controls are in place and monitoring to measure the controls in place are working. In order to

monitor the first correctly it must be understood what one is trying to control. For example, in a temperature regime the company will check that cold water temperatures are less than 20 °C and hot water temperatures are hotter than 60 °C. When using chlorine, the levels should be between 0.2 - 0.5 ppm. As pH has a direct link to the effectiveness of a chlorine regime, this would also be measured. It is worth mentioning that when measuring the likes of chlorine or pH, one is less interested in precision and more interested in trends. Knowing that the chlorine level has changed from 0.21 - 0.22 or that a pH level is 7.952 has little benefit in this application. One simply needs to be able to tell that the levels are within the required ranges. This should be kept in mind when choosing field equipment. Along with monitoring that control measures are in place, it must also be monitored that these controls are having the required effect. In nearly all cases this involves bacterial monitoring. Historically this will involve sampling and forwarding samples onto a suitable laboratory. Although not necessarily incorrect, the limitations of this type of monitoring should be understood and the alternatives known. When carrying out bacterial analysis, the time from sampling to analysis is all important. As soon as the sample is taken, conditions of the sample will alter. Ideally analysis should take place as soon after sampling as possible, ideally in the field. Over recent years a number of simple in-field tests have been produced that will allow this. As well as avoiding the problems associated with external sampling and analysis, field testing has additional advantages. Through field testing there is no more requirement for coordinating sampling with helicopters or port calls. A quicker turnaround on results, useful in itself, allows one to react quicker should corrective action be required. It will then allow verification by re-checking that corrective action has worked. In addition, due to the reduced costs, the company can carry out a more robust monitoring programme. For the same price as a three sample quarterly regime a site could carry out a 10 sample weekly regime. No more worrying about the correct bottles, whether they are in date or who they should be sent to.

Records

A very simple element within the management programme but no less important, record keeping will allow the company to demonstrate to clients, authorities and others that control is being met and that the management programme is in place and effective. Additionally through record keeping the company can also begin to trend results and start to compare one set of results to another. Are the results consistent throughout the year? Is there the same control across all assets? Are there differences across regions? By keeping complete and accurate records the company will then be able to benefit from the information gained allowing it to maintain or perhaps improve its overall control approach.

Review

The final element of the management programme is a review mechanism. A review system should always be in place in order to confirm the objectives of the programme are being met. It will also ensure its effectiveness, identify any changes and allow for opportunity for improvement. A formal review should be carried out annually however regular mini reviews are advised.

Conclusion

People often say, ‘I don’t drink it. I always use bottled water’. However, if one doesn’t think it is okay to drink then why should it be okay to shower, cook or wash with? Over the years there has been a loss in understanding of the importance of good quality water offshore. There is often the assumption that it is just there. Only when problems occur does one begin to appreciate the possible risks associated with its supply. The fire fighting approach often seen offshore is not the most efficient or cost-effective and is never the safest. The simple six element approach described should go a long way to help provide a step by step method towards developing a correct water management programme. There are many more complicated things that are achieved offshore than providing good quality water. Let’s give it a go and everyone will benefit. And who knows the tea might even taste better.