South Staffs Water

incorporating

CAMBRIDGE WATER COMPANY

Calculation Methodology for Asset Health ODIs 2015-2020

November 2015

Introduction

In our PR14 business plan, and subsequent final determination from Ofwat, South Staffs Water has two asset health metrics which will apply between 2015 and 2020:

- Serviceability infrastructure
- Serviceability non-infrastructure

The purpose of an asset health metric is to monitor how the physical assets that we operate are performing, and provide confidence that they are likely to continue to perform in the future, to deliver a reliable and safe supply of drinking water to customers.

We are continually investing in our assets as part of our long term holistic asset management plan. The term 'assets' means the equipment that we use to extract water, treat it, and distribute it to our customers' taps. Examples of assets include pumping stations, reservoirs and pipes. The investments that we make ensure that these assets continue to operate reliably and meet all required legal and regulatory standards.

So that we can provide performance indicator coverage of the complete 'source to tap' supply system, our two asset health metrics, serviceability infrastructure and serviceability non-infrastructure, relate to different types of assets. Our 'infrastructure' indicator covers our underground pipes that distribute water to customers' taps and our 'non-infrastructure' indicator covers the pumping stations, treatment works and reservoirs that we operate which supply and store the water.

As the asset health is a critical factor in our ability to supply our customers with water now and in the future, our asset health metrics are subject to financial penalties. This means that if we allow our assets to deteriorate excessively we will pay a financial penalty proportional to the scale of the deterioration. The extent of these penalties and how they are calculated is explained further in this document.

The asset health metrics presented here are very much about the long term management of our assets, rather than short term localised performance issues. We have implemented other performance measures which are also subject to financial penalties to ensure that the day to day local performance is appropriately monitored and maintained. Therefore these asset health metrics work alongside our other incentives to ensure that the complete spectrum of our performance has full coverage.

We would welcome any comments on our asset health methodology. Please direct feedback to regulation@south-staffs-water.co.uk by 8th January 2016.

Measuring Asset Health

Defining the indicators

Due to the wide range of assets we operate and maintain, from pipes to pumping stations to reservoirs, there is no single measure that adequately describes asset health. Therefore we use several indicators and combine them together. Asset health therefore, is a composite measure made up of several sub-indicators. These indicators have been in use within the industry for over ten years, and so there is a good history of performance that we can use to demonstrate long term stability.

The sub-indicators are as follows:

Serviceability infrastructure The focus of the infrastructure asset health is on the condition of the underground pipes that supply customers, and the resultant service levels that customers receive. There are five indicators that we use to monitor this, as follows.	
Mains bursts	**The number of burst mains we have each year within our distribution network.** A higher number of burst mains is an indicator that the underground pipes are deteriorating.
Unplanned interruptions greater than 12 hours	**The number of properties which have a water supply interruption for longer than 12 hours.** If more customers are being interrupted for long durations, then this is another indicator that the underground pipes are deteriorating, particularly the larger trunk mains which can take longer to repair.
Low pressure	**The number of properties experiencing persistant low pressure.** The ability of our network to supply water at an adequate pressure for customers to use can be compromised if our pipes are bursting more or otherwise deteriorated.
Discolouration contacts per 1000 properties	**The number of customer contacts we receive telling us that the water coming from the tap is discoloured, calculated per 1000 properties.** It is common for older underground pipes to be made from iron, which corrodes as it ages. This metric tells us whether customers are experiencing discoloured water due to corrosion of the iron pipes.
Turbidity, iron and manganese compliance index	**The percentage non-compliance of regulatory samples for turbidity, iron and manganese.** In our daily operation we take lots of water samples from different points in our network to monitor its performance. The turbidity, iron and manganese sample results we combine together for this sub-indicator can indicate a mains deterioration problem.

Serviceability non-infrastructure The focus of the non-infrastructure asset health is on the quality of water being produced from our pumping stations, treatment works and reservoirs, with four indicators used to monitor this. There is one further indicator which measures the overall reliability of the equipment we use.	
Water treatment works coliforms non-compliance	**The percentage non-compliance of regulatory samples for coliforms at our water treatment works.** It is essential for the safe supply of drinking water that our treatment works effectively remove bacteria from the water. We take samples daily to check that the treatment works are operating properly and this measure reports the percentage of samples where a coliform is detected. When this happens the treatment plant is fully investigated to determine if there is a problem.
Service reservoir coliforms non-compliance	**The number of service reservoirs where more than 5% of samples have failed for coliforms.** Our reservoirs store treated water before it is distributed to customers through our network of pipes. We take samples daily to ensure that the water in the reservoirs is safe to drink and to monitor the structural integrity of the reservoir itself.
Water treatment works turbidity non-compliance	**The number of water treatment works where more than 5% of samples have failed for turbidity.** Our treatment works are also designed to filter out particles that are present in the raw water. We monitor the treatment processes to ensure that this filtration is performing as required, and also to ensure no particulate matter is being passed into our network from any other sources.
Enforcement actions for microbiological parameters	**The number of enforcement actions that the DWI have served on us where we need to take action in response to a problem.** When sample failures occur these get fully investigated, with follow up samples and detailed engineering assessments of the assets. In rare circumstances we may find a problem which needs to be solved, and we report this to the DWI who may serve an enforcement notice on us to ensure we rectify the issue.
Unplanned maintenance	**The number of unplanned maintenance jobs that we undertake on our assets.** An increasing trend of unplanned maintenance jobs would indicate that assets are deteriorating.

Defining the performance thresholds

For each sub-indicator we have set thresholds which define where the acceptable level of performance is. These thresholds are used to warn against possible deterioration in asset health which needs to be investigated and rectified. The thresholds are also used in the calculation of the composite asset health ODIs which can lead to a financial penalty if deterioration is observed. There are two important thresholds for each sub-indicator:

- The reference level

  This is the level of performance we would typically expect for an indicator, and it represents a level of performance that is acceptable and not indicative of any systemic deterioration in asset health.

- The upper control limit

  This is the level of performance which is not acceptable, and is indicative of an issue with that indicator which needs to be investigated. Continued performance at the upper control limit or beyond would be indicative of systemic deterioration in asset health.

For each asset health sub-indicator, the thresholds are given in the following table. .

Serviceability infrastructure sub-indicator	**Units**	**Reference level**	**Upper control limit**
Mains bursts	Nr	1360	1784
Unplanned interruptions greater than 12 hours	Nr	72	216
Low pressure	Nr	0	20
Discolouration contacts per 1000 properties	Nr/1000	0.92	1.05
Turbidity, iron and manganese compliance index	%	0.02	0.08

Serviceability non-infrastructure sub-indicator	**Units**	**Reference level**	**Upper control limit**
Water treatment works coliforms non-compliance	%	0.05	0.15
Service reservoir coliforms non-compliance	%	0.00	2.10
Water treatment works turbidity non-compliance	%	0	2
Enforcement actions for microbiological parameters	Nr	0	1
Unplanned maintenance	Nr	3756	4818

These thresholds were proposed by us and agreed by Ofwat in December 2014 as part of our final determination price control for 2015 to 2020. The thresholds themselves are based on those we have used in previous years. For some measures we have tightened the thresholds to ensure that we maintain levels of service to customers that have previously been achieved.

Defining the weight of each sub-indicator

Each of the five indicators for infrastructure and non-infrastructure will not carry equal weight when combined into the composite asset health ODIs. This is because some indicators are more directly reflective of deterioration than others.

Prior to 2015, Ofwat used a lead indicator approach where one of the five indicators for each type of asset was designated as the most important indicator and given the most weight.

For 2015 to 2020 we have built on that approach by assigning numerical weightings to more accurately reflect the contribution of each indicator to long term asset health monitoring, and to more effectively represent the impact on customers from each sub-indicator.

For the infrastructure sub-indicators, there is a significant amount of crossover with our other outcome delivery incentives. We have therefore maintained a high weighting on mains bursts which under Ofwat's previous method was the headline indicator, and which is not represented in our other outcome delivery incentives. Unplanned interruptions, discolouration contacts and the TIM compliance index are all respresented in other outcome delivery incentives. Low pressure is an important measure also, but historically we do not have a significant low pressure issue in our network and so we have not increased its weighting above the others.

Our non-infrastructure sub-indicators are generally not well represented in other outcome delivery incentives and so we decided to increase the weightings of those which impact more directly on customers. This means that the sub-indicators relating to water quality are given higher weightings than under the previous Ofwat methodology and unplanned maintenance, which is internally focussed, is given a lower weighting. We have also moved away from a single lead indicator since all of the water quality indicators, but particularly both of the coliforms non-compliance indicators, are important measures.

These weightings were proposed by us and agreed by Ofwat in December 2014 as part of our final determination price control for 2015 to 2020.

The weightings are as follows:

Serviceability infrastructure sub-indicator	**Weighting**
Mains bursts	50%
Unplanned interruptions greater than 12 hours	12.5%
Low pressure	12.5%
Discolouration contacts per 1000 properties	12.5%
Turbidity, iron and manganese (TIM) compliance index	12.5%

Serviceability non-infrastructure sub-indicator	**Weighting**
Water treatment works coliforms non-compliance	30%
Service reservoir coliforms non-compliance	30%
Water treatment works turbidity non-compliance	20%
Enforcement actions for microbiological parameters	15%
Unplanned maintenance	5%

Calculating the composite asset health ODIs

For each of our two asset health ODIs, we calculate a composite metric using the five sub-indicators defined for each ODI. There are three steps to the process:

Step 1: apply points to the sub-indicators depending on performance relative to the reference level and upper control limit.

Step 2: multiply the points by the indicator weighting.

Step 3: total the weighted points to determine the asset health composite indicator for that year.

Step 1

Points are applied to each sub-indicator based on its performance against the defined reference level and upper control limit. The fundamental principle is that the worse the performance is, the more points are assigned, and the reference level and upper control limit form the boundaries for these points. The points system is as follows:

a) If the sub-indicator is at or below the reference level, then no points are assigned.
b) If the sub-indicator is above the reference level but below the upper control limit, then one point is assigned.
c) If the sub-indicator is at or above the upper control limit, then two points are assigned.
d) If the sub-indicator is at or above twice the upper control limit, then three points are assigned.

Example: If mains bursts, an infrastructure asset health sub-indicator, was at 1,400 bursts this year, then it would be above the reference level (1,360) but below the upper control limit (1,784), incurring 1 point.

Step 2

For each indicator, the points are multiplied by the weighting for that indicator to determine the weighted points.

Example: the 1 point earned from mains bursts above would be multiplied by the weighting for that indicator, in this case 50%, giving a weighted score of 0.5 points.

Step 3

The weighted points for all sub-indicators are totalled to form the composite asset health score for that year.

Example: the 0.5 weighted points from mains bursts above would be added to the weighted points from the other four sub-indicators, giving a total number of points for the year.

Calculating financial penalties

Both of our asset health ODIs have financial penalties applied to them. This means that if we underperform we will be subject to a financial penalty. The penalties are calculated annually and applied at the next price review in 2019, and will therefore be reflected in customer bills for the period 2020 to 2025.

In our PR14 business plan submission we set out that financial penalties will be calculated from a three year rolling average of the asset health composite indicators. This is to ensure that the incentive correctly reflects the longer term nature of asset health rather than reacting to day to day issues covered by our other outcome delivery incentives.

In line with the period prior to 2015, we have retained three main categories of overall asset health. These categories are:

Stable: meaning the three year rolling average score for asset health is within the expected range. If the rolling three year average is below 1 point then we classify asset health as stable.

Marginal: meaning the three year rolling average score for asset health is above the expected range. If the rolling three year average is equal to or greater than 1 point, but less than 1.75 points then we classify asset health as marginal.

Deteriorating: meaning the three year rolling average score for asset health is significantly above the expected range. If the rolling three year average is equal to or greater than 1.75 points then we classify asset health as deteriorating.

We will pay annual penalties for each year that asset health (for either infrastructure or non-infrastructure) is classed as marginal. These penalties will be:

Asset health ODI	Annual penalty for marginal assessment
Serviceability infrastructure	£76k
Serviceability non-infrastructure	£97k

We will pay a one off larger penalty in the period 2015 to 2020 if at any point either of the asset health indicators (infrastructure or non-infrastructure) are classed as deteriorating. This penalty would apply even if the asset health was later recovered to a stable position, to reflect the severe detriment that has occurred. As it is significantly larger, this penalty would supercede any marginal penalties that may have been applied in the period.

Asset health ODI	One off penalty for deteriorating assessment
Serviceability infrastructure	£379k
Serviceability non-infrastructure	£487k