South Staffs Water

Beal Consultants

Review of Sustainable Economic Level of Leakage

Report prepared for
South Staffs Water

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Executive Summary

To support the development of the 2014 Water Resource Management Plan and Business Plan South Staffs Water has reviewed the profile of the Sustainable Economic Level of Leakage (SELL), taking account of its understanding of the network and leakage management, incorporating the latest regulatory guidance and updating its modelling approach to be more specific to its circumstances.

During the development of the revised SELL Simon Beal of Beal Consultants worked closely with the company, reviewing and changes to approach, offering advice and challenging any revised assumptions.

This report summarises the key elements of approximately six months challenge and support of the SELL between Autumn 2012 and Spring 2013. Additional suggestions and support were provided during regular progress meeting and feedback.

Based on the review and detailed discussions with the company we conclude that the company has:

- Developed a robust bespoke relationship between active leakage control costs and the level of leakage. This modelling builds on the principles used within APLE, but more accurately reflects leakage management activities within the company.

- Revised its understanding of supply pipe leakage, and is proposing to update this further in the development of the 2014 business plan. This will include full quantification of how many of the suspended leaks within the backlog have actually been repaired.

- Considered a wide range of alternative leakage management policies within its analysis, including mains renewal, pressure management, trunk mains leakage management, DMA sub-metering and new technology. This analysis is on-going and we consider it is essential that it is fully integrated within the SELL analysis and the business plan.

- Calculated externalities in-line with the latest guidance from the Regulators.

- Undertaken the economic analysis in-line with the latest guidance from the Regulators. This has also included an assessment of the impact of weather on the company's ability to achieve its leakage targets.

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1. INTRODUCTION

The Sustainable Economic Level of Leakage (SELL) is a development of the Economic Level of Leakage (ELL) that has been derived by the company for a number of years. Since the original analysis in the 1990s there have been significant developments both in the approach to leakage management and to the best practice guidance that the company has followed when deriving the SELL.

To support the development of the 2014 Water Resource Management Plan and Business Plan the company has reviewed the profile of the SELL, taking account of its understanding of the network and leakage management, incorporating the latest guidance and updating its modelling approach to be more specific to its circumstances.

During the development of the revised SELL Simon Beal of Beal Consultants worked closely with the company, reviewing and changes to approach, offering advice and challenging any revised assumptions.

This report summarises the key elements of approximately six months challenge and support of the SELL between Autumn 2012 and Spring 2013. Additional suggestions and support were provided during regular progress meeting and feedback.

2. REVIEW OF APPROACH

2.1 OVERVIEW

Within the Sustainable Economic Level of Leakage methodology there are a number of key elements, all of which are critical to the analysis and will impact on the derivation of the SELL. All these elements were reviewed/updated by the company.

During the revision of the SELL by the company following aspects were reviewed and updated:

- Relationship between cost of leakage management (active leakage control and repairs) and the level of leakage,
- Leakage management policy, including the approach to supply pipe repairs, and alternative leakage management options,
- External (Environmental, Social and Carbon) costs and benefits of leakage and leakage management,
- Marginal Cost of Water (this review was undertaken early in the study and is reported separately[1]),
- Steady state repair rate (this review was undertaken early in the study and is reported separately[2]),
- Economic Analysis – how the least cost leakage profile was derived.

2.2 LEAKAGE MANAGEMENT COSTS

2.2.1 Active leakage control costs

One of the most significant changes to the methodology has been the development of a company specific relationship between leakage management costs and the level of leakage. For all previous reviews of the SELL the company has used the generic APLE model, however for the 2013 revision the company has used a relationship that is tailored to its circumstances.

The generic APLE model is developed as a relationship using the current level of leakage, current cost of maintaining leakage in a steady state and the policy minimum level of leakage. The bespoke company relationship uses the same general principles, including the concepts of steady state and the policy minimum level of leakage, but the gradient of the curve is derived by modelling the impact on a group of DMAs rather than a single DMA. The relationship is developed from an understanding of the leakage management processes within the company, and includes splitting costs between fixed and variable components, number of DMAs, number of DMA technicians and the average time between DMA sweeps.

We reviewed the bespoke relationship in detail and consider that it builds on the concepts used in the generic APLE relationship, and is more tailored to company data and circumstances.

[1] Review of Steady State Repair Rate, Beal Consultants, November 2012.
[2] Review of Marginal Cost of Water for use in the SELL calculation, Beal Consultants, October 2012.

A review of the steady state analysis, which was undertaken by the company to derive the steady state repair rate, and adjust actual costs to steady state costs is reported in *Review of Steady State Repair Rate*, Beal Consultants, November 2012.

2.2.2 Repair Costs

The repair costs were updated, and a revision to the APLE model now allows a more accurate estimation of future repair costs should the mix of types of repairs change. As the SELL analysis continues to be based on the assessment of steady state repair costs only impact on the transitional cost of moving between different levels of leakage.

2.2.3 Policy Minimum Level of Leakage

Like the majority of relationships between cost and level of leakage the South Staffs model uses the concept of the policy minimum level of leakage. We reviewed the analysis which has been updated by the company, and consider that it is robust and represents a fair assessment of this component of leakage.

2.2.4 Night Use Allowances

Like all companies, when estimating leakage from nightlines the company makes an allowance for night use, which is then deducted from the nightline. The company currently makes no allowance for seasonal variation in night use allowances. It is likely that night use could increase during summer months (due largely to garden watering) and during cold winter periods (due to unmeasured customers leaving taps running to prevent them freezing).

When reviewing the steady state analysis we considered if periods of exceptional night use in the summer and winter periods could have influenced the assessment of year-on-year changes in leakage which are a key element of the steady state analysis. We concluded that a more accurate assessment of exceptional night use would not impact significantly on the steady state analysis, but may provide an approach to improve the estimate of leakage.

2.3 NEW POLICY OPTIONS

2.3.1 Supply pipe policy

As part of its on-going assessment of leakage and leakage management the company has reviewed its approach to supply pipe leakage. Whilst it can repair bursts in other parts of the network any supply pipe bursts are the responsibility of the customer. Over recent years there has been an apparent increasing trend in the backlog of supply pipe repairs mainly because the company does not have ultimate control over the repair of these bursts.

The company identifies supply pipe leaks during its normal active leakage control processes, but does not repair them directly. This can lead to an apparent increase in the backlog of supply pipe leaks, although this should be viewed differently to the backlog of leaks on the company's network. A backlog supply pipe leak is simply a leak that the company is aware of, but has not been repaired; an increasing backlog does not necessarily mean an increasing level of leakage, simply that more have been identified for future repair.

The company has, however, re-visited a sample of apparently *suspended* supply pipe repairs and has identified that approximately 57% of these have actually been repaired by the customer. This revised assessment reduces the estimated supply pipe losses.
We have reviewed the analysis undertaken by the company, and although we agree with the key conclusions we made the following observations on its draft report:

- The company reviewed 255 suspended supply pipe leaks, but did not make it clear what proportion of the total number of suspended supply pipe leaks or the total backlog of leaks.

- We questioned the assumption that the oldest supply pipe leaks had been repaired, and asked the company if this was critical to the analysis and if it could be justified or investigated further.

We support the company's intention to review the remaining suspended supply pipe repairs to determine a more accurate assessment of supply pipe leakage. We also consider that the knowledge gained from this analysis may also make it possible to estimate the proportion of the *active* supply pipe repairs that may have been repaired.

We recommend that the company continues to review its policy to supply pipe leakage, including an estimate of the contribution this makes to total leakage and the economics of reducing this component.

2.3.2 Mains renewal

The company has undertaken a detailed review of the impact of mains rehabilitation on leakage levels. This has shown that mains rehabilitation has a significant impact on mains bursts but it is much less significant on other elements on the network. This analysis has shown that whilst mains rehabilitation will maintain serviceability (as measured by bursts) there will still be an underlying increase in leakage repairs.

We reviewed the company's analysis and concur with the company's conclusions. We recommend that the company continue to investigate ways to integrate burst driven mains rehabilitation with possible leakage benefits to identify any possible synergies at the DMA or sub-DMA level.

2.3.3 Pressure management

In line with the latest guidance from the Regulators the company has assessed the economic level of pressure management and integrated this within the SELL target setting process. The company recognises that this is an on-going process and will continue to review the cost effectiveness of further pressure management.

We recommend that the company continues to investigate potential pressure management options for inclusion within the business plan. We consider that the company should aim to further integrate active leakage control and pressure management within its SELL analysis.

2.3.4 Other options and new technology

We reviewed the range of options considered by the company, which includes the impact of trunk mains leakage, DMA sub-metering, leak repair times and the impact of new technology. Although we did not review this analysis in detail we consider the

analysis presented by the company to be sensible and recommend it continues to develop these areas for the 2014 business plan.

2.4 EXTERNALITIES

For the 2013 update to the SELL the company has used the latest guidance from the Regulators published in *Review of the calculation of sustainable economic level of leakage and its integration with water resource management planning*, Ofwat, Environment Agency, DEFRA, October 2012 by SMC.

Since publication of the SMC report a revised table of carbon costs was published by the Department of Energy and Climate Change (DECC) which recommends significantly higher costs of traded carbon from 2020. These revised values were used by the company within their economic analysis.

It is recommended that both the medium and high values of carbon are used for sensitivity testing.

2.5 ECONOMIC ANALYSIS

2.5.1 Least cost leakage profile

Although the company has no supply-demand deficit within the planning horizon it followed the best practice guidance by considering the long-term costs of alternative leakage profiles. This approach allows the company to include the impact of transitional costs and the increasing costs of carbon post 2020.

In previous assessments one of the largest obstacles to making further reductions to leakage is the transitional cost associated with finding and repairing the additional leaks necessary to drive down leakage. Although the higher steady state active leakage control costs could be justified by the lower value of lost water, the savings were not sufficiently large to justify the reductions in leakage.

The economics of reducing leakage appear to be changing, the higher projected costs of carbon appear to be making reductions in leakage economic. There are however, continued uncertainty over the future value of carbon and the long-terms benefits of leakage reductions.

Despite the apparent barrier of transitional costs the company has still reduced leakage over recent years, largely as in response to the severe weather impacts. The transitional costs have therefore been spent, so maintaining the lower level of leakage will now be more cost effective than assumed at the previous ELL review.

The company has also considered both short-term and long-term leakage targets, recognising that there will be long-term pressures to reduce leakage both from an environmental and supply-demand perspective.

2.5.2 Leakage target setting

Although the company is able to manage leakage, and aims to achieve any agreed targets there is a degree of variability that is driven by the weather. In benign years leakage will be naturally lower whereas in years with adverse weather, particularly those with extremely cold winter periods, leakage will be higher. We reviewed the

analysis of the variability in leakage driven by weather factors and found it to be robust.

At the time the SELL was prepared in March 2013 there was uncertainty over the approach that will be adopted by Ofwat when deciding if companies have achieved the leakage targets. Leakage targets can only be set if the mechanism for assessing "pass" or "failure" is confirmed.

The company considered two types of leakage targets that could be proposed:

- A fixed target, that would be achieved in every year, whatever the weather. For the company (which has very little summer driven night use) this target will effectively be the level of leakage that can be achieved economically in years with an extreme period of winter weather. In most years leakage will be below this target.

- A leakage range that recognises the impact weather has on the company's ability to manage leakage. The leakage target will be based on the weather in a normal year, with an upper band reflecting leakage in an adverse year, with the lower band reflecting a benign year.

The company developed a leakage range, on the assumption that this approach would be adopted in due course by the Regulators. We reviewed the company's approach an concur with its analysis, which we feel could form a sensible framework for setting leakage target ranges.

3. CONCLUSIONS

Based on the review and detailed discussions with the company we conclude that the company has:

- Developed a robust bespoke relationship between active leakage control costs and the level of leakage. This modelling builds on the principles used within APLE, but more accurately reflects leakage management activities within the company.

- Revised its understanding of supply pipe leakage, and is proposing to update this further in the development of the 2014 business plan. This will include full quantification of how many of the suspended leaks within the backlog have actually been repaired.

- Considered a wide range of alternative leakage management policies within its analysis, including mains renewal, pressure management, trunk mains leakage management, DMA sub-metering and new technology. This analysis is on-going and we consider it is essential that it is fully integrated within the SELL analysis and the business plan.

- Calculated externalities in-line with the latest guidance from the Regulators.

- Undertaken the economic analysis in-line with the latest guidance from the Regulators. This has also included an assessment of the impact of weather on the company's ability to achieve its leakage targets.