

Issue 159 February 4, 2005

HOW TO ...

(1) Measure Service Levels: What's a Sewer Spill Worth?

'A central tenet of asset management is: A utility's core mission is to provide, at lowest cost, those levels of service that offer the best value proposition to the community.

Some utilities attempt to measure the levels of service they provide, but very few reach out to their communities to understand their customers' value perceptions.

Even in Australia and New Zealand, countries quite advanced in asset management, this is an emerging endeavour. ' (The CSIRO have looked at the customers' perception of water outages for Hunter Water in NSW.)

In this issue we look at a survey designed by Ken Harlow, Brown and Caldwell, to look at the value that customers place on a sewer spill.

There is much to be learned in

- The way the survey was set up (3 pages, 11 short questions; real time viewing; on line self analysis)
- The results themselves.

On January 25, Ken posted his survey on his website and invited readers of his daily Internet Newsletter, California Water News, to respond. 676 of them did so in 4 days (over 100 in the first 4 hours!)

You may find the results surprising.

AND

(2) Be a World Class Asset Manager

'It is within the context of the business environment that an asset manager is judged to have performed well or poorly.

Well performing assets alone do not indicate a world class performing asset manager.

To achieve this while meeting all customer, environmental, licence, and statutory duties and, at the same time, make an acceptable rate of return for the asset owners - that is the sign of a good asset manager.

A world-class asset manager would be instrumental in defining the business environment and objectives, and would shift the perception as to what a good asset manager does'.

In this issue, Dave Openshaw, EDF Energy, begins a series of articles for asset managers who, having achieved technical excellence in asset management, aspire to a better understanding of the business environment in which the assets need to perform.

Public Works Managers

Read this series of articles to see why Business Vision applies to you, too!

Researched and written by Dr Penny Burns, AMQ International, unless otherwise specified, Published fortnightly. Subscription, Comment, or Inquiries to

AMQ International
PO Box 75 Salisbury South Australia
Tel 618 8281 5795

Email: sam@amqi.com Website: www.amqi.com

Here are the questions asked—note the simplicity of the design, which may account for the great and rapid response!

Page 1 Establishing the Context

Thanks for participating in our short survey, “What’s a Spill worth?” The eleven multiple-choice questions will take you about five minutes to complete.

This topic is of great interest in asset management circles because (or so AM people believe) you should know the value of risks before deciding how much money to spend in addressing them. And in the sewer collection business, spills are the King Kong of risk.

AM people also believe that the customer is king, so put your customer hat on for this survey. Regardless of your real-life role in the water resources industry, you are now simply a knowledgeable customer of a sanitary sewer agency.

Aggregate results of this survey will be presented in our e-mailed newsletters when complete. No attribution of individual responses will be made, although there will be some analysis like “Regulators think this way, while sewer utility people think that way.”

Should be very interesting! So here we go. [Next →](#)

Page 2 Asking The 8 Multiple Choice Questions

As a sanitary sewer utility customer: How much do you think your utility should be willing to spend to avoid a single spill of raw sewage? Remember, you are answering as a customer of your local utility and we’re talking about exactly one spill, not (for instance) a spill per year.

Following are the spill sizes and characteristics – please check one box for each type of spill.

1. To prevent one small spill (100 gallons or less) that doesn’t reach a stream, river, or ocean, my utility should be willing to spend as much as:

- | | |
|---------------|-------------------|
| (a) \$100 | (e) \$1 million |
| (b) \$1,000 | (f) \$10 million |
| (c) \$10,000 | (g) \$100 million |
| (d) \$100,000 | |

2. To prevent one small spill (100 gallons or less) that reaches a stream, river, or ocean, my utility should be willing to spend as much as:

3. To prevent one medium spill (1,000 gallons) that

The Survey

What’s a Spill Worth?

doesn’t reach a stream, river, or ocean, my utility should be willing to spend as much as:

4. To prevent one medium spill (1,000 gallons) that reaches a stream, river, or ocean, my utility should be willing to spend as much as:

5. To prevent one large spill (10,000 gallons) that doesn’t reach a stream, river, or ocean, my utility should be willing to spend as much as:

6. To prevent one large spill (10,000 gallons) that reaches a stream, river, or ocean, my utility should be willing to spend as much as:

7. To prevent one very large spill (1,000,000 gallons) that doesn’t reach a stream, river, or ocean, my utility should be willing to spend as much as:

8. To prevent one very large spill (1,000,000 gallons) that reaches a stream, river, or ocean, my utility should be willing to spend as much as:

Same 8 value options for all questions. [Next →](#)

Page 3 Information about Respondents—3 Questions Only

Only three more questions! Please tell us just a bit about yourself

I work at

- Sewer Utility
- Water Utility
- Regulatory Agency
- Educational Institution
- Other Government
- Other Private Sector
- Retired/Not Working

The area where I live can best be described as

- Coastal
- Inland

If living in California only – I think of the area where I live as:

- Northern California
- Central California
- Southern California

Page 4—Thanks!

That’s it! Many thanks for your response to this survey. When we have enough responses, a link to the data and the analysis will be posted in the California Water News.

THE RESULTS: WHAT'S A SPILL WORTH? OR, A BRIEF LOOK AT COMMUNITY VALUES

By Ken Harlow, Brown and Caldwell, USA

There is more about the methodology and its limitations as well as more analysis of the results on Ken Harlow's Water Asset Management Site at www.bcwaternews.com/AssetMgt/

January 25 through 28 and readers of the daily Internet newsletter *California Water News* were invited to respond. 676 of them did so, identifying themselves by industry sector, geographic location, and proximity to the ocean. In the survey instrument itself, respondents were asked to answer the questions as knowledgeable utility customers, regardless of their professional affiliations.

The question was originally raised in my mind when reviewing a proposed program for reducing spills at a major utility. The program had an annual cost, solely for spill reduction, and also a numerical target for the reduction. When I divided the annual cost by the number of spills avoided each year, I saw that the cost per spill avoided was almost a quarter of a million dollars. These were mostly smaller collection system spills.

There is no claim that the values expressed in this survey are representative of the broader community – see “Limitations” in Appendix A. However, utility managers can probably consider them representative of people in California associated with the water/wastewater industry who have an active enough interest in the subject that they are willing to respond to such a survey.

I had to ask myself, “If I were a customer of this utility, would I consider the money I send in every month wisely spent?”

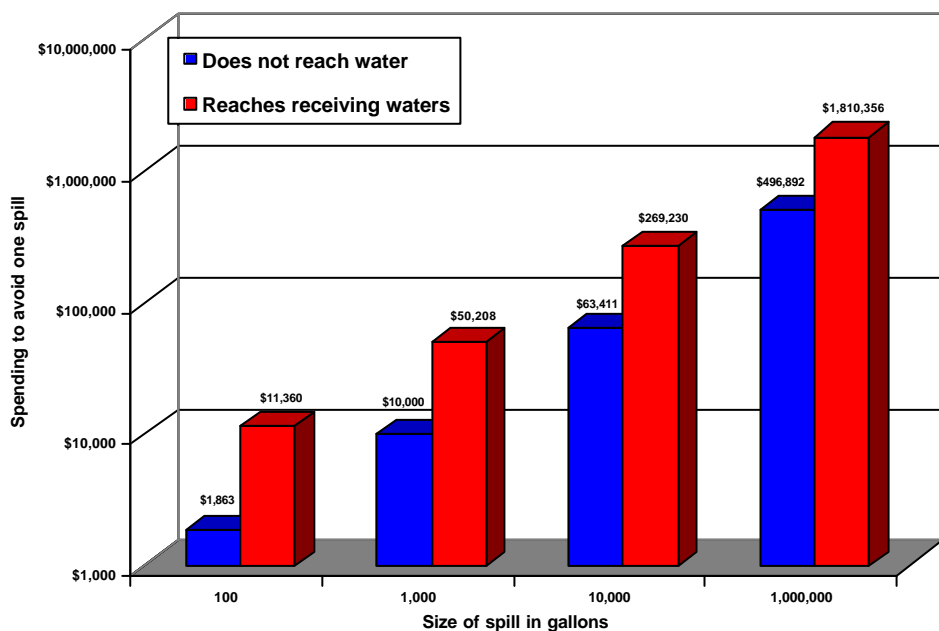
You may find the results interesting and, perhaps, surprising.

Thus, this survey. The survey instrument, shown in Appendix C, was posted on the Internet from

A Broad Look at the Value of Avoiding Spills

The values of spill avoidance stated by the respondents as a whole are shown below. The vertical axis is logarithmic for clearer presentation

Figure 1.
Willingness to spend to avoid a spill, all respondents



As might be expected, the respondents are willing to pay more to avoid larger spills, and more for spills reaching receiving waters than “dry” spills.

However, the same data look quite different when expressed in dollars per gallon:

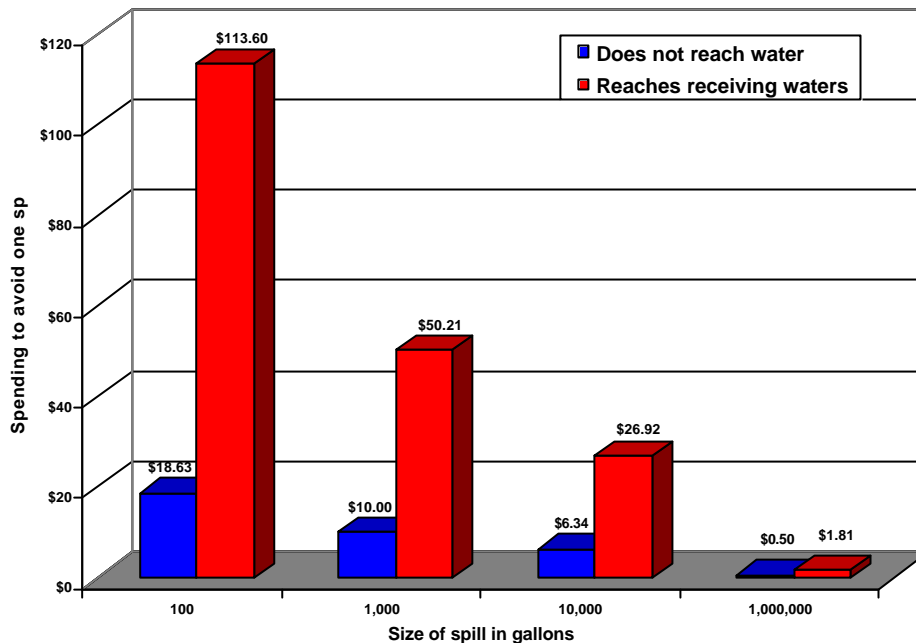


Figure 2: Willingness to spend to avoid a spill, per-gallon basis

Although willingness to spend rises with the size of the spill, it is by no means a linear relationship.

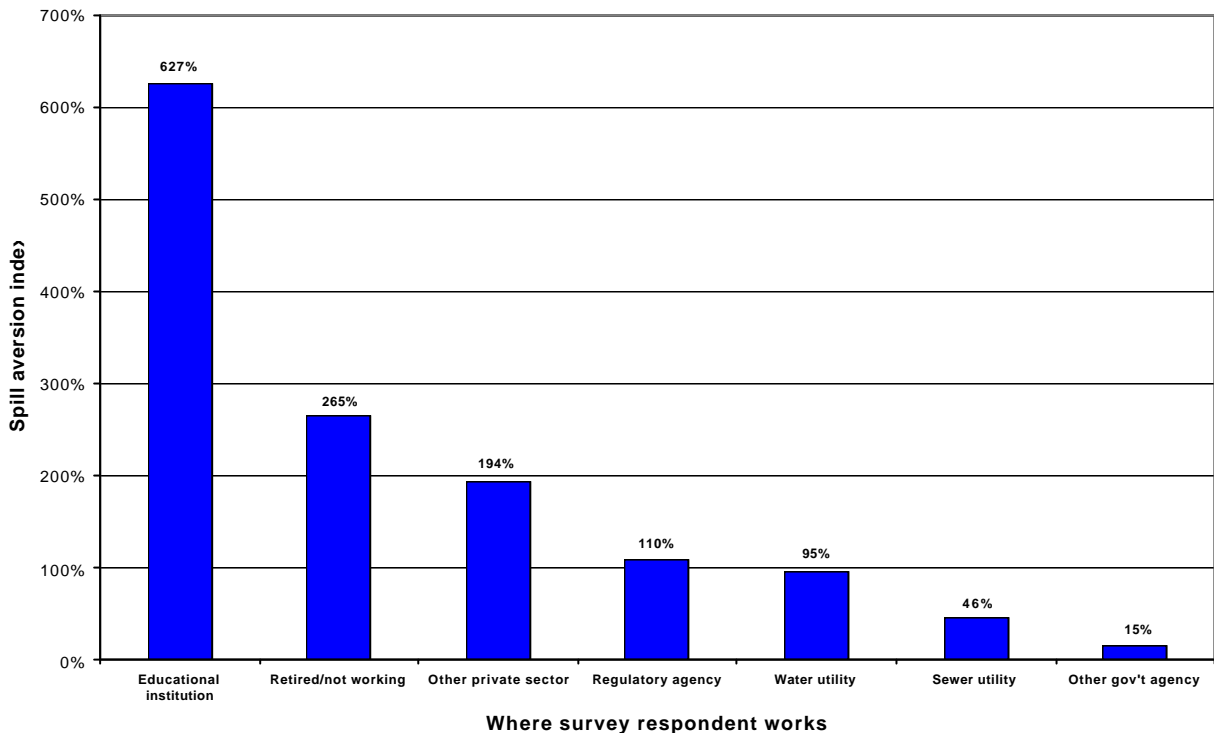
The respondents are willing to pay less and less per gallon spilled as the size of the spill increases. This may be due to a line of thinking that large spills may not be correspondingly more expensive to address (in terms of spill prevention) than small ones.

Spill Aversion by Respondent Demographics

To explore how different types of respondents felt about spills, I used a “spill aversion index.” The index is simply the respondent sub-group’s willingness to pay to avert a spill divided by the willingness of the overall respondent group. For example: If a sub-group is willing to pay \$18,000 to avert a 1,000-gallon spill and the overall group is willing to pay only \$10,000, then the sub-group’s spill aversion index for this type of spill is 180% (\$18,000 divided by \$10,000).

Spill aversions indices for each sub-group and for each spill type were calculated. Where these had to be combined (e.g., all spills reaching receiving waters), geometric averaging was used.

Finally, let's look at how respondents in different industry sectors feel about spills.



There are some real surprises here:

- Respondents at educational institutions are willing to spend far more to avert spills than other sub-groups. No explanation could be found in the detailed survey results.
- Respondents at sewer agencies are willing to spend relatively little on reducing spills. Perhaps that's because they are in the best position to know the extreme difficulty of spill reduction and the sometimes low probability of success of spill reduction programs.
- "Other government agency" respondents are, by a good margin, the sub-group least willing to spend to avert spills.
- The relatively high spill aversion among "other private sector" respondents may be due to the perceived dangers posed by sewage spills to normal business operations, particularly in coastal areas.
- Spill aversion among respondents from regulatory agencies is quite close to that of the overall respondent group.

The regulatory agency response was surprising; I had expected these respondents to be quite allergic to spills. Therefore, I decided to look at this sub-group a little more closely. The next figure shows their spill aversion indices in more detail. (see www.bcwaternews.com/AssetMgt/)

WHY? Have a look at the more detailed information Ken provides on his website—and if you have ideas as to why the results may be occurring the way they do, do write to him, you will get a good reception.

Using the Data

Go to the original document on www.bcwaternews.com/AssetMgt/
To see the details of how to use the data provided by the survey (or any similar survey that you may care to run yourself).

The methodology Ken employs enables him to calculate the value to the community of any level of spending to contain sewer spills.

He makes allowance for the regional demographics (which we haven't shown here) and applies them to different types of spill according to spill sizes.

Below is a hypothetical example of the willingness to spend of customers for a utility which has a spill reduction target of 400 spills annually

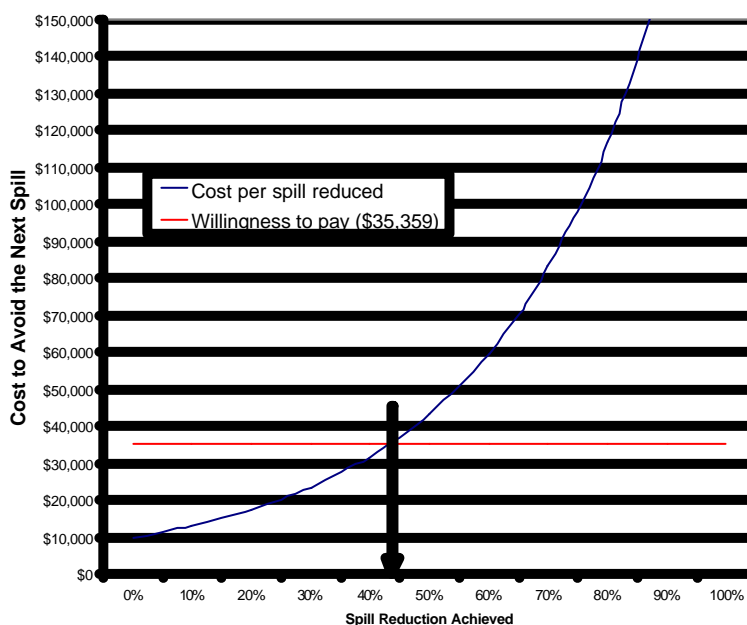
A	B	C	D	E	F	G
Size of Spill, gallons	Type of spill	Willingness to Spend, California Average	Adjustment for Northern California	Willingness to Spend, Northern California (C x D)	Number of Spills Avoided	Maximum Spending (E x F)
100	Does not reach water	\$1,863	0.90	\$1,674	200	\$334,896
100	Reaches receiving waters	\$11,360	1.22	\$13,895	10	\$138,950
1,000	Does not reach water	\$10,000	1.15	\$11,498	140	\$1,609,660
1,000	Reaches receiving waters	\$50,208	1.35	\$67,930	25	\$1,698,248
10,000	Does not reach water	\$63,411	1.08	\$68,326	4	\$273,304
10,000	Reaches receiving waters	\$269,230	1.41	\$379,269	20	\$7,585,380
1,000,000	Does not reach water	\$496,892	1.26	\$626,603	0	\$0
1,000,000	Reaches receiving waters	\$1,810,356	1.38	\$2,503,204	1	\$2,503,204
Totals:					400	\$14,143,642
					Per spill:	\$35,359

Figure 7 Sample Calculation of Maximum Spending on Spill Reduction

Knowing its incremental costs for sewer spill reductions and their customers willingness to pay, the utility can now calculate the maximum amount that it should spend on spill reduction to provide a value for money service to its customers.

Note all figure refs are those given in the original text to facilitate your follow through.

Fig 8: Sample Calculation of spill reduction target fitting customer



Understanding the Business Environment

By Dave Openshaw, Head of Strategic Network Development, EDF Energy

Part 1: Financial

Introduction

The key aspects of the business environment that an asset manager must assess and influence can be grouped under the following headings:

- Financial
- Environment, Health and Safety
- Regulatory / Statutory
- Commercial / Economic
- Political / Public Image
- Long-term Asset Value

This series of short articles is aimed particularly at infrastructure and utility asset managers who perceive the need to exert greater influence over company, regulatory, and even government policy. The articles address the question: what does world-class performance look like? This vision is then compared with common practice today, which in turn leads to some conclusions regarding priorities.

Past Practice—Accepting and Managing a Budget

A perhaps extreme, but otherwise not inaccurate, interpretation of past practice might be that asset managers would have been given a budget, the derivation of which they may have had very little influence over, and would then have got on with the process of finding the best way to spend it. This would effectively limit the asset manager's remit to one of controlling his budget, and preclude the possibility of a balanced view of financial risks and objectives alongside all other business risks and objectives.

Good Practice—Exerting Influence over the Budget

A good asset manager would exert influence over the budgeting process in order to ensure that a more balanced view of financial risk prevailed. But a world class asset manager would assess risk, including financial risk, from first principles, with an understanding of the financial drivers on the asset owner.



World Class — Proposing Budget Options

In effect, he/she would propose the budget or, even better, a number of budget options, each describing the risks and opportunities associated with that option.

Understanding Financial Risk

To fully understand financial risk, an asset manager needs to consider the internal finances of the company because these determine the value of money. The value of money will depend upon the cost of capital, i.e. the expected return on equity and the cost of debt. It will also reflect the opportunity cost, i.e. the value that can be gained by investing in the particular activities in which the company is involved that deliver the highest return. The overall cost of capital can then be balanced against the overall potential return, recognising that the higher the risk associated with any particular investment, the higher needs to be the potential return. An ideal investment portfolio would achieve an overall balance between risk and return.

Understanding Cash Flow

Cash-flow is another important element of financial risk. A profitable company can fail to survive if cash-flow is insufficient to cover out-goings and creditors. In this way it can be more valuable in some circumstances to receive (or save) cash than a longer-term return; in effect, the cost of capital is then high. Put

another way, in terms of investment planning, the effect on DCF analyses of options will be to increase the applied discount rate, i.e. so that the value of future inward or outward cash-flows is heavily discounted compared with the value of today's cash position.

Understanding Financial Structure

Again the financial structure of the company is an important consideration here. A highly geared company needs to be able to generate sufficient cash in order to guarantee payment of interest, whereas a lowly geared company can, at least in theory, defer dividends to manage a temporary cash-flow imbalance. A potentially critical consideration here is the credit rating of the company. If the company is not considered to be 'investment' grade (due, say, to being already highly geared), then it will have difficulty in actually raising capital at an acceptable cost.

The financial strategy of the company will determine the optimum timing and level of spending, which may or may not match the optimum timing from a pure asset management perspective.

A possible conflict that might occur is that between the investment needs of the network and budgetary constraints. Although long-term financial planning is always undertaken, it invariably needs to be under continuous review as the sometimes conflicting concerns over regulation and budgetary constraints may come to the fore. One way this can manifest itself is that in a 'regulated' environment, the allowed revenues and weighted average cost of capital (WACC) assumed by the Regulator may differ from that necessary to optimise the timing and level of investment. This may arise if Regulators use simplistic modelling and benchmarking techniques to determine allowed revenues, rather than good quality asset management information provided by the company.

Understanding the Regulatory Contract

For a regulated monopoly business such as a utility, a further overarching factor is the 'regulatory contract' that might be implied (or even overtly stated) by the company's acceptance of the regulatory settlement following a formal price review. The revenue a regulator

allows a company to earn in order to finance its (efficient) operating costs and cost of capital, may be based on a number of assumptions, not least of which might be the delivery of an agreed investment programme. Any departure (in quantum) from that programme might be deemed as inefficient over or under expenditure unless the asset manager is able to demonstrate otherwise. If, on the other hand, the settlement includes an efficiency incentive (opex or capex) then an asset manager can be pivotal in identifying where genuine efficiencies can be realised, and hence make a direct contribution to the company's financial position.

Current Practice

Financial considerations are often still outside the remit of asset managers. An all-too-familiar scenario is that investment is repeatedly cut back as budgetary constraints are seen as the most pressing issue until, at some point, the regulatory and asset value risk becomes so great that spending is increased sharply to lessen this risk. This leads to inefficient 'stop-start' investment, and usually results in the type of expenditure that can be made quickly rather than that which would be the optimum for the network. This scenario can be avoided, or at least mitigated, if financial risk is understood. For example, increased investment is often possible if asset managers can demonstrate that the regulatory and asset risk would be too great without that investment.

Learning points

A world class asset manager will not always be able to control short-term financial constraints. The challenge is to present information in such a way that the impact, and risk, is fully understood when such decisions are made. The budgetary constraints may sometimes appear to be the most pressing issue, when in reality they are not.

For a world class asset manager working in a regulated monopoly business, understanding the 'regulatory contract' is essential, because he/she will be in an ideal position to understand the asset risks and opportunities surrounding different investment options and revenue (e.g.. maintenance) saving initiatives. †

Next Issue: Pt 2: Environment, Health & Safety