A NEW APPROACH TO WET WELL CLEANING

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67th Annual Water Industry Engineers and Operators' Conference
Sports and Leisure Centre - Wodonga
1 and 2 September, 2004

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1.0 INTRODUCTION

Traditionally, wet well cleaning has meant time-consuming hand held hosing and periodic entry to the wet well by maintenance personnel to facilitate physical removal of soils. More recently high volume, automatic water sprays have been used.

Whilst these approaches have proven effective there are a number of drawbacks, most notably:

- intensive labour requirement
- the OH&S implications of wet well entry
- high water consumption
- potential fouling of downstream sewers

A new and innovative approach to the problem of wet well cleaning has been developed in which a specially developed biological product is sprayed into the wet well. This new approach has proven highly effective and overcomes the drawbacks of conventional spray systems e.g.

- water consumption is reduced and
- there is no fouling of downstream sewers as the greases are degraded biologically

Capital costs are comparable to conventional spray systems and operating costs are offset through savings in labour. To illustrate these points a case study itemising capital, installation and operating costs and the results and savings achieved is presented.

2.0 SYSTEM DEVELOPMENT

Development of the system came about through our association with Dubbo City Council, who had several concerns regarding their wet well cleaning and maintenance procedures e.g.

- the number of personnel involved in pump station cleaning and maintenance
- the time taken by the crews at each pumping station
- the number of site visits per week required
- occupational health and safety issues related to wet well entry

To overcome these problems, Council were considering installation of automatic well wash systems at a number of locations.

Although these types of systems are generally effective, there were concerns regarding their high water consumption and the possibility of fats and greases being transferred through the system creating problems in down stream sewers.

Following several meetings between Council, Southern Cross Laboratories and our local team an alternative system was developed to address these concerns.

The requirements for the system were:

- Low capital cost
- Low operating cost
- Low water consumption
- Easy to install
- Reduce grease-fat buildup
- Reduce odours
- Maintain clear and easy access for maintenance and repairs

3.0 PRINCIPLE OF OPERATION

The principle of the system is to mix the biological complex Actizyme Liquid G with mains water and spray the resultant solution into the wet well. The spray is operated at regular intervals via a variable sequence timer, although systems can be made to operate off specific inputs, e.g. pump starts, sewage flow, hydrogen sulphide levels etc.

4.0 SYSTEM COSTS

4.1 Capital Costs

4.1.1 *Equipment*

Equipment costs vary somewhat according to the site, however a basic single spray system is approximately $1500. Multiple spray head systems may range to $2000.

4.1.2 *Installation costs*

Typically costs range from $1000 for a single spray head installation to $1500 for multiple spray head installations.

4.1.3 *Total Capital Costs*

Thus, total of equipment and installation costs typically range from $2500-$3500 for a fully installed system.

4.2 Operating costs

Operating costs again depend on the site and the nature and extent of the problems. The chart below illustrates approximate operating costs based on ADWF.

ADWF (kL)	Minimum ($/yr)	Maximum ($/yr)
to 500	1,500	2,500
500-1000	2,500	4,000
1000-2000	4,000	5,500
2000-4000	5,500	7,500
4000-6000	7,500	9,500
6000-10000	9,500	10,500

Note: I*n cases where odour is the main concern it is recommended that Stink Stopper be used instead of Actizyme Liquid G. In this case, costs are somewhat lower than*

listed above.

4.3 Water Consumption

As discussed one of the key advantages of the system when compared to conventional well washing systems is the low water consumption.

Conventional well wash systems rely on the physical removal of grease-fat and other scums via high pressure, high volume water sprays. Thus water consumption can be very high, particularly when multiple installations are in place, or where the problems are particularly bad.

In this new system however, water is only required to activate the biological complex and spray mist it into the wet well. Typical water consumption figures are shown in the following table.

ADWF (kL)	Water Usage (L per day)
to 500	50-75
500-1000	75-100
1000-2000	100-150
2000+	150-200

This is less than conventional well wash systems and in most cases less than would be used to manually hose down the wet well.

5.0 CASE STUDY: ALFRED ST. DUBBO

5.1 Background

Annular wet well – dry well design with an average dry weather flow of approximately 1.5 megalitres per day. The wet well is split into two wells, A and B. Wet well A is operated Monday-Friday, and wet well B Saturday-Sunday.

5.2 Problems

The main concern was the high level of grease-fat in the wet well, particularly near the outlet sumps where the build up could be up to 100 mm thick. The fats were also difficult to remove with hand held hoses. To make matters worse, the pump station was located adjacent to a caravan park and odour complaints were received on a regular basis.

5.3 Cleaning Schedule

5.3.1 *Prior to Spray System Installation*

A three man crew was hosing the pump station down three times per week, Monday, Wednesday and Friday. Cleaning was primarily via manual hose down, however the fats were difficult to remove so the results were never entirely satisfactory. Wet well entry was also required on occasion to remove stubborn grease-fat deposits.

5.3.2 *After Spray System Installation*

Almost immediately the visiting schedule was reduced to twice weekly, Monday and Friday.

Soon after crews reported that the levels of grease-fat were almost non-existent and a once per week visiting schedule was instigated.

5.4 Operating Costs Before & After

5.4.1 *Prior to Spray System Installation*

The cost of routine maintenance of the pump station can be calculated as follows:

- three men
- three times per week
- one & half hours (each) per visit
- i.e. total hours 13.5 hours per week
- labour cost at (say) $50 per hour

This equates to a total labour cost of $675 per week, or $35,100 per year, to maintain the pump station.

5.4.2 *After Spray System Installation*

Similarly, three men, once per week, half hour (each) per visit, total 4.5 hours per week at (say) $50 per hour for a total labour cost of $225 per week, or $11,700 per year.

To this we need to add the operating costs of the system. In this case the Actizyme Liquid G usage is approximately $70 per week, or $3640 per year.

Thus total cost after installation; including labour and consumables is:

- $225 per week labour
- $ 70 per week Actizyme Liquid G

Thus total cost is $295 per week, that is $15,340 per year.

5.4.3 *Cost Savings*

Prior to installation of the spray system the costs associated with routine cleaning and maintenance of the Alfred Street pump station were about $35,100 per year.

After installation of the spray system the annual cost, including consumables was reduced to $15,340. Thus, the overall cost saving is $380 per week or $19,760 per year.

This represents a 55% reduction in the overall costs associated with routine cleaning and maintenance of the pump station.

5.4.4 *Summary of Costs & Savings*

Before Spray System ($ per year)	After Spray System ($ per year)	Cost Saving ($ per year)
~ $35,100	~ $15,300	~ $19,800

5.4.5 *Other Benefits*

As discussed previously these cost savings were achieved along with the following benefits:

- Significant reduction in grease-fat build up in the pump station and downstream sewers
- Easier and more effective cleaning
- Better work environment for operators
- Safer work environment for operators
- Significantly less odour
- Far fewer complaints

5.5 Other Installations

Based on this initial work twelve more systems have been commissioned at Dubbo, with further systems planned. Systems have also been installed at several other municipalities, and theses are performing at the same high level.

6.0 SUMMARY

This new approach to wet well cleaning is proving extremely effective and is achieving the defined objectives i.e.

- Low capital cost
- Low installation cost
- Low operating cost
- Low water consumption
- Significantly less grease-fat build up
- No re deposition of grease-fat in sewers
- Significantly less odour
- Easier, faster and more effective cleaning
- Safer work environment

At the same time significant savings in cleaning and maintenance costs are being achieved.

It is a measure of these exceptional results that a further seven systems have been installed at Dubbo with additional systems to be commissioned within the City over the coming months.

7.0 ACKNOWLEDGEMENTS

The engineering and operations staff of Dubbo City Council for their input, suggestions, help and support.

Rex Baker & Stan Sokol of Dalkleen Hygiene Services for their development work, hours commissioning and 'fine tuning'.