

SELECTION, INSTALLATION AND OPERATION OF BULK WATER FILLING STATIONS



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ABSTRACT

There are numerous risks and issues associated with the supply of water via portable standpipes in reticulation systems.

This paper will essentially focus on the process by which Riverina Water went through to redesign the water delivery method and install Bulk Water Filling Stations across the distribution network. Portable standpipes, as well as some conventional overhead standpipes, have now been replaced.

The project was a pioneering experience, Riverina Water worked in unison with the manufacturer to overcome the difficulties associated with installation and commissioning.

The new system has dramatically changed the way in which Riverina Water supplies water to Councils, contractors, developers, water carriers and farmers.

1.0 INTRODUCTION

In 2009 Riverina Water identified serious safety risks and issues with the operation of metered portable standpipes throughout the distribution area. Portable standpipe users, in Wagga Wagga and throughout the rural system, included Councils, contractors, developers, water carriers and farmers. The purpose for drawing water is usually road construction, filling rainwater tanks, sewer jetting, street cleaning and farm use.

In October 2009 Riverina Water resolved to change from the current standpipe system to reduce risk and improve the service. Other than for Council staff, the use of metered portable standpipes in Riverina Water hydrants is now prohibited. Contractors, developers, water carriers and farmers are utilizing the new bulk water filling station system.

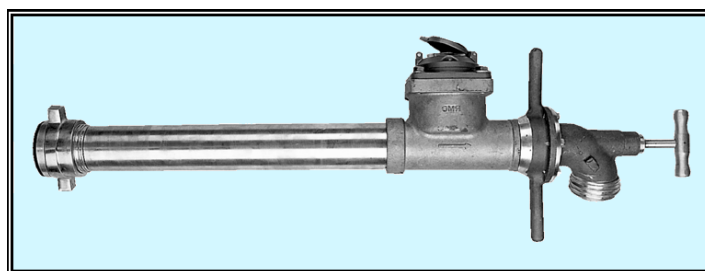


Figure 1: *Portable metered standpipe*

2.0 DISCUSSION

2.1 The Issues Associated with Portable Standpipes

Management System Issues (staff chasing readings)

A problematic management system was required to sell water via metered standpipes. Issues included the difficulty of relying on users to submit their portable standpipe usage readings every month and a meter sight check every three months.

As a result Riverina Water staff were constantly chasing monthly readings for billing and

this cost council valuable time and money. Readings from some customers were submitted in excess of 11 months apart.

The extent of problems for Riverina Water in managing a large quantity of portable standpipes also included standpipes being left unattended, being stolen or being used by unauthorised persons. In one instance, due to the pressures of drought, a farmer was found to be lending his standpipe to over 30 other farmers with no Riverina Water approval.

Indiscriminate Hydrant Selection (not using approved hydrant points)

As a Riverina Water regulation all standpipe customers were informed that only certain approved hydrants could be used as water fill points. This was not happening and many customers were indiscriminately using any hydrant point that was convenient at the time.

The issues arising from this indiscriminate use included pressure effects on connected customers, noise, traffic safety and footpath damage.

The drought promoted relaxation in the management of standpipe use to the point where standpipes were being loaned and even farm dams were being filled.

Damage to Mains and Hydrants (incorrect use of standpipes)

Incorrect or improper use of portable standpipes in Riverina Water hydrants was a serious issue. Over the years there have been numerous incidents which included;

- Fast shut-down resulting in severe water hammer. Pressure surges can also upset control systems in long rural pipelines.
- Jamming the standpipe in the main.
- Driving away with the standpipe still in the hydrant, breaking the hydrant yoke or the hydrant tree.

Wastage of Water

Water is a scarce and valued resource so reducing spillage is a necessity. Water was regularly wasted as a result of using portable standpipes. Some of the causes include failing to use standpipes correctly and bursting water mains; or damaging the seat of the hydrant and seal, causing water loss.

Repairs of Faulty Standpipes

Riverina Water staff regularly spent unnecessary time repairing and servicing damaged portable standpipes for customers. At times repair and meter calibration could not be completed in-house and at Councils expense these units were returned to the manufacturer.

Backflow Prevention

The risk of water contamination to connected customers is an important safety issue. There is no backflow prevention in portable standpipes and due to the movement of the water carters' it is difficult for their vehicles to be checked for compliance.

Water Quality for Water Carter Customers

The water carters' lack of compliance with NSW Health guidelines was an issue.

Driver Safety

The safety of operator was often in jeopardy when using portable standpipes.

To fill the truck it was usually necessary to climb up on top of the tank to insert and remove the hose. There was also minimal road safety for the user as hydrants can be located on or close to the road.

2.2 Evaluating the Options

Riverina Water's Aim

Riverina Water was driven by the following criteria;

- To improve the level of service for Riverina Water Customers.
- To comply with NSW Health Guidelines for Water Carters.
- To maintain the integrity of the distribution system.
- To streamline the management and billing system.

NSW Health Guidelines for Water Carters

NSW Health has developed guidelines for the operation of water carting for drinking and domestic use. It is the water carter's responsibility that these guidelines are adhered to.

Along with outlining all that is required for water carters to transport potable water safely the guidelines also state that the water supply authority should keep the following records for water carters that draw from a reticulated water supply;

- Name of owner and business.
- Contact details for owner of the business.
- Details of water carting vehicles, drivers, make, model, registration, tank volume, type and material of tank.
- Date of last inspection of each vehicle.

Riverina Water aimed to better satisfy these guidelines with the new system.

Consulting Users and Their Feedback

Before making significant changes to the bulk water delivery system Riverina Water consulted with the users of portable standpipes.

This feedback was useful when it came to making a final decision on a suitable supply alternative. The consultation emphasised that by design, travelling distances may be greater and time to fill may be longer. There was some criticism where travelling distances were significantly increased.

Customers were encouraged to give feedback on proposed water filling locations to minimise travel distances and overheads. This is an ongoing process and additional locations are being addressed now.

Product Selection Process (what is available)

The product selection process was based on the following criteria;

- Product lead time and price.
- Style and configuration.
- User friendliness of the product.
- Ease of installation.
- Backflow Prevention.

- Billing system options.
- Robustness.
- Data Transfer system required.
- Flow Rate and power supply.
- Supplier reputation.

Due to the current lack of demand from water utilities within Australia only three products were available for consideration. These varied greatly in what they provided. Council adopted the option that was comprehensive and met most of the product selection criteria.

2.3 The Smart Alternative “Bulk Water Filling Stations”

The Adopted System and How it Works

The adopted Water Filling Station arrangement is like a self-service fuel bowser where you have an account with credit and pay monthly. All units are supplied factory fitted with a filter, back flow system, control valve and meter. The unit is powered by a 12 volt battery which is trickle charged using a solar panel. Figure 2 shows a picture of the pipe work arrangement inside the water filling station bottom enclosure.



Figure 2: *Pipe work arrangement of water filling station*

Customers just connect their hose with Camlock fittings, swipe their iButton, and press the on and off button. Billing data is then automatically transmitted using mobile phone coverage back to the service provider in Melbourne and readings are immediately uploaded and accessible to Riverina Water using the internet.

The details outlining who withdrew the water, the quantity used and the date and time it was extracted are available on the internet. Riverina Water then uses this information to generate the monthly bills.

Electronic Access Key (iButton)

The iButton is an electronic key that provides a globally unique ID number which Riverina Water uses to identify the operator.

Customers simply swipe their iButton and after electronic verification they can start to fill their tanker. If a customer substantially fails to follow procedures, the iButton can be deactivated by Riverina Water. Figure 3 shows a picture of the touch screen interface and iButton scanner located in the top enclosure of the unit.



Figure 3: *Touch screen interface and iButton scanner*

The Application Procedure

To access the Water Filling Stations, customers need to visit Riverina Water's Wagga Wagga office and complete an application form. The application form requires their personal and business details, usage information, vehicle and tank information as well as the filling method. The customer is then issued with an iButton and key. The application requires details of the specific truck the iButton has been allocated for.

Tanker Connection

To reduce physical safety risks all customers have been advised that tankers need to utilise a bottom fill system to eliminate the risk associated with climbing up onto the truck and tank. This best includes an external pipe with fixed air gap or an approved backflow system.

Water Filling Station Locations

The location of the Water Filling Station units was based on the following criteria;

- Mains size and location.
- Supply and pressure limitations.
- Traffic and pedestrian safety.
- The proximity to the water carters' destination.
- Local Government regulations and approval.
- Effect on the public. (e.g. noise levels in residential areas etc.)
- Strength of mobile telephone coverage.
- Security of the unit.
- Cost of works required to comply with all of the above.

2.4 The Changeover

Incentives for returning Outmoded Standpipes

As part of the changeover process, customers who returned their portable standpipe to Riverina Water attracted a reimbursement sum of \$200.00 per standpipe. This incentive has been a positive step for Riverina Water in re-acquiring as many as possible of the 83 portable standpipes that were being used in the distribution network.

The reimbursement applied to both standpipes hired from Council and privately owned standpipes.

Technical Issues

The new Bulk Water Filling Stations combine a number of technologies and required outcomes. There have been quite a few teething problems during the installation and commissioning process, although most of these have now been amended.

It has been almost a year between delivery of the first units and “smooth” operation. Over this time it has been essential to deal directly with the manufacturer as the distributor was not capable of rectifying the issues.



Figure 4: *The installed bulk water filling station*

3.0 CONCLUSION

Riverina Water has currently installed a total of 8 Bulk Water Filling Station throughout our distribution network. The units have been operational since the middle of October, and we are currently receiving mixed feedback from our customers, who are still getting used to the new system. Three more units are now in the process of being installed.

We are satisfied with our decision to adopt the Water Filling Station system. The acquisition and installation process has been a protracted and costly pioneering experience. However, I would now recommend such a Bulk Water Filling Station system to other water utilities.

4.0 ACKNOWLEDGEMENTS

I thank the local water carriers, developers, contractors and farmers for the high level of tolerance that has been shown during the installation and commissioning process of the new system. Thank you to all Riverina Water staff who have worked tirelessly towards this outcome.

Special thanks to both Greg Finlayson and Pat Davis who were kind enough to give me the opportunity to present this paper.