CHALLENGES OF MEETING COMMUNITY EXPECTATIONS IN WATER QUALITY PROJECTS

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ABSTRACT

Myrtleford is a regional town of approximately 3,500 people located in the Ovens Valley, North East Victoria.

During the late 1990's, as part of multiple town water treatment upgrades, North East Water (NEW) engaged many communities with the aim of achieving their most suitable water supply improvement. The Myrtleford community was quite active and very passionate about their water supply, assuming that it was 'pristine' in quality, and therefore strongly opposed any chemical addition, particularly Chlorine. At the time, an innovative solution was introduced, however this eventually led to a supply that had a single UV disinfection barrier only. In a nutshell, although the community were satisfied with the water quality, this solution did not provide safe drinking water. Multiple *E. Coli* detections in the reticulation resulted in a seasonal boil water notice and undertaking with Department of Health to fix the issue.

Potentially, NEW could have simply added chlorine to the water supply, however continued to consult and work with the community to ensure the best solution for both parties could be achieved. With ongoing strong opposition to chlorine, NEW made commitment to construct a multiple barrier WTP with emphasis on ensuring a low and consistent dose of chlorine.

This paper presents the challenges of meeting Community expectations when upgrading the Myrtleford drinking water supply to ensure provision of safe drinking water.

1.0 INTRODUCTION

Myrtleford is a regional town of approximately 3,500 people located in the Ovens Valley, North East Victoria. The Myrtleford drinking water supply is sourced from a semi-protected catchment which feeds into a 400 ML raw water reservoir.

The Myrtleford community have historically had a drinking water supply free of chemicals, and once NEW began to consider the introduction of treatment barriers in the late 1990's, it soon became evident that there was strong passion amongst community members about drinking water. There was a sense of belief that the water was pristine and safe, with strong opposition to the introduction of chemicals.

Such strong community opinions presented many challenges to NEW, however ultimately resulted in a desired outcome that met both parties' requirements.

2.0 DISCUSSION

2.1 History and Challenges

During the late 1990s, the Myrtleford drinking water supply was identified to be upgraded as part of multiple town upgrade program. At that time, North East Water (NEW) strategically prioritised both 'Community Engagement' and 'Innovation', which were important criteria for the roll out of the WTP upgrades.

Although NEW staff were aware of general health risks within their water supplies, DWQMS and risk assessment process (based on hazardous events) were in their infancy, and possibly were not as informed as the latter assessments. The scope was clear, a drinking water supply that minimised chemical usage and was preferably innovative. With Turbidity averaging approximately 0.9 NTU, an 'expert' solution was identified which consisted of UV and Ozone/GAC. The Community agreed on the option, and NEW committed to construct the WTP. Within a short period of operation, it was evident that the WTP had issues, particularly with the Ozone/ GAC components. Milky water (due to lack of gas relief infrastructure) and bacteriological build up within the GAC filters resulted in plant failures. Fundamentally, the ozone generation was limited in capacity (non-corona system) and was eventually 'moth-balled' within 12 months of start up. This left the treatment train as simply an 'on demand' 160 lamp low pressure UV system. While NEW were facing these challenges, the Community Reference group was maintained, and regularly updated on the issues.

With the existing plant having only a single UV disinfection barrier, the Operations group were presented with two key issues. Firstly, being an on demand system (having no clear water storage) and secondly the system was non-residual (reticulation management). These factors made the system difficult to operate and manage which led to water quality failures. Lack of Chlorine residual led to reticulation *E Coli* detections, due to particle shielding through UV & seasonal conditions (strong correlation with pathogen detection and water temperature). Multiple detections in the system resulted in a seasonal boiled water notice (6 monthly) enforced by the Department of Health, implemented during 2008. In a nutshell, although the community were satisfied with the water quality, NEW could not guarantee safe drinking water. A Department of Health Undertaking to fix the issue was agreed by NEW.

Due to the challenges with the water treatment system, NEW maintained the Community Reference Group, which allowed ongoing communication and subsequent community awareness that the issues needed to be resolved. Meetings with the Community reference group over approximately 12 years emphasised the shortfall of this system, particularly the challenges of operating a non-residual disinfection reticulation. During this period new Victorian Regulatory requirements were also introduced (both SDWA (2003) & SDWR (2005)) which forced NEW to comply. The Community Reference Group was made aware of the changes to regulations.

2.2 The Processes that Led to Change

The Department of Health undertaking was a journey that NEW took with the Community Reference Group. The plan included:

- Engage an expert consultant to assist with the process (who could be trusted by the Community, see acknowledgements)
- For NEW and consultant to explore all treatment options available, including non residual and alternate disinfection and chlorination
- To agree on preferred treatment options followed by development of full system Concept
- Design, construct, operate.

Potentially, chlorine could have simply been added to the water supply, however NEW continued to consult and work with the Community to ensure the best solution for both parties could be achieved.

Throughout the process, it became evident that Chlorination was the likely (based on cost and efficacy) disinfection option. With ongoing strong community opposition to chlorine, NEW made a commitment to construct a multiple barrier WTP with emphasis on ensuring a **low** and consistent dose of chlorine. A recommendation by the consulting engineer was to include 'water-stability' within the treatment process. The addition of water stability infrastructure would best assure the commitment from NEW to having the lowest practical residual.

Despite community reluctance, the message became clear that this was the path required to ensure future safe drinking water. Broader community communication activities occurred such as general information sessions and regular Newsletters updates. NEW also arranged for Community Reference group members to visit another WTP site to observe and gain some understanding of a full multi barrier (DAFF) water supply system.

2.3 Changes to Supply

The primary concern to both NEW and the Community Reference group was the risk of various chemical reactions (& dirty water) within the distribution, particularly due to the first time introduction of Cl_2. If this was not carefully managed, the reputation of both parties could be significantly damaged. To minimise this risk, an extensive flushing program was planned and carried out prior to the introduction of the new supply. Again, the Community was notified of this activity.

In August 2011, fully treated water was delivered to town. The new process consisted of water stabilisation (with Lime / CO_2), Coagulation/flocculation, DAFF, chlorination as well as a 4ML fully baffled clear water storage. The target chlorine residual at town entry was 0.4-0.5 mg/l, in order try and maintain a residual in the reticulation system of greater than 0.2 mg/l.

Despite NEW's best effort to prepare the reticulation for the change of supply, complaints were made, with a significant flux in the first month. Figure 1 highlights the complaints data, clearly demonstrating the 'spike' during the first month. Follow up 'dead end' and 'spot' flushing of problem areas and complaint sites demonstrated to customers that we were committed to achieving improved water quality.

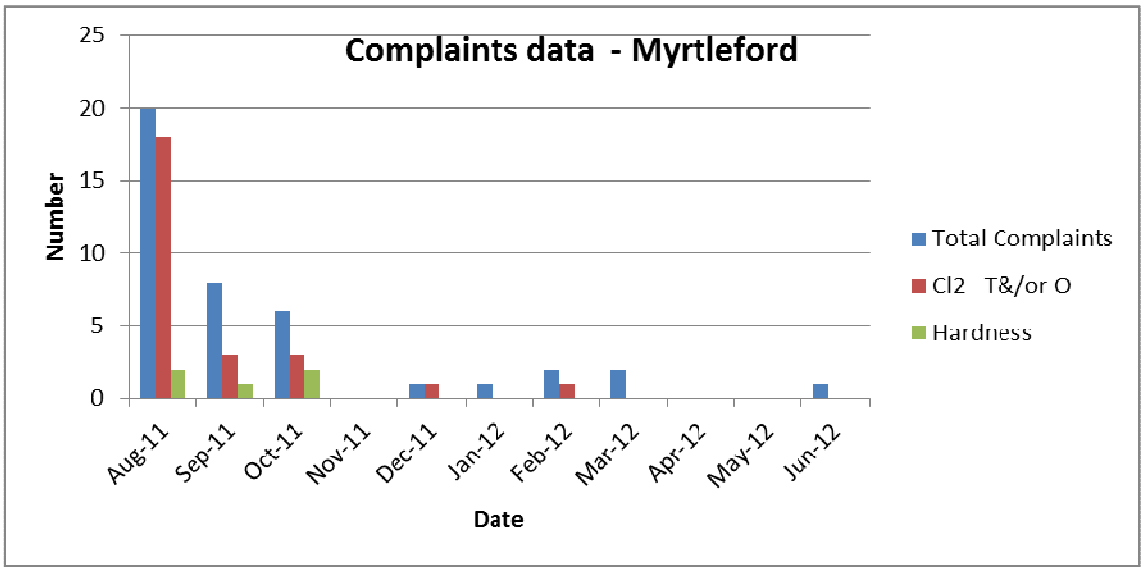

Figure 1: ***Complaints data since the introduction of the new supply***

The design of the new WTP included the introduction of 'Water Stability', or Lime and Carbon Dioxide (CO_2) to aid with reticulation quality consistency. The source water has alkalinity of <10 mg/l. This was the key initiative that addressed the most critical concern from the Community Reference Group, chlorine.

The introduction of the Lime and CO_2 has raised the alkalinity of the final water to 35mg/l which has resulted in stable water quality throughout the reticulation. Coupled with DAFF, the water stabilisation allows NEW to operate with Chlorine residuals at town entry typically 0.5 mg/l, and reticulation testing has shown we are maintaining 0.2 - 0.4 mg/l, with stable pH to our customers. Figure 2 illustrates water quality results throughout the reticulation since the introduction of the new drinking water supply.

There have been some negative consequences as a result of the addition of alkalinity into the drinking water system. Figure 1 (category 'Hardness') shows that there were complaints of noticeable changes to soap lathering, as well as scale build up in the boilers at the local mill.

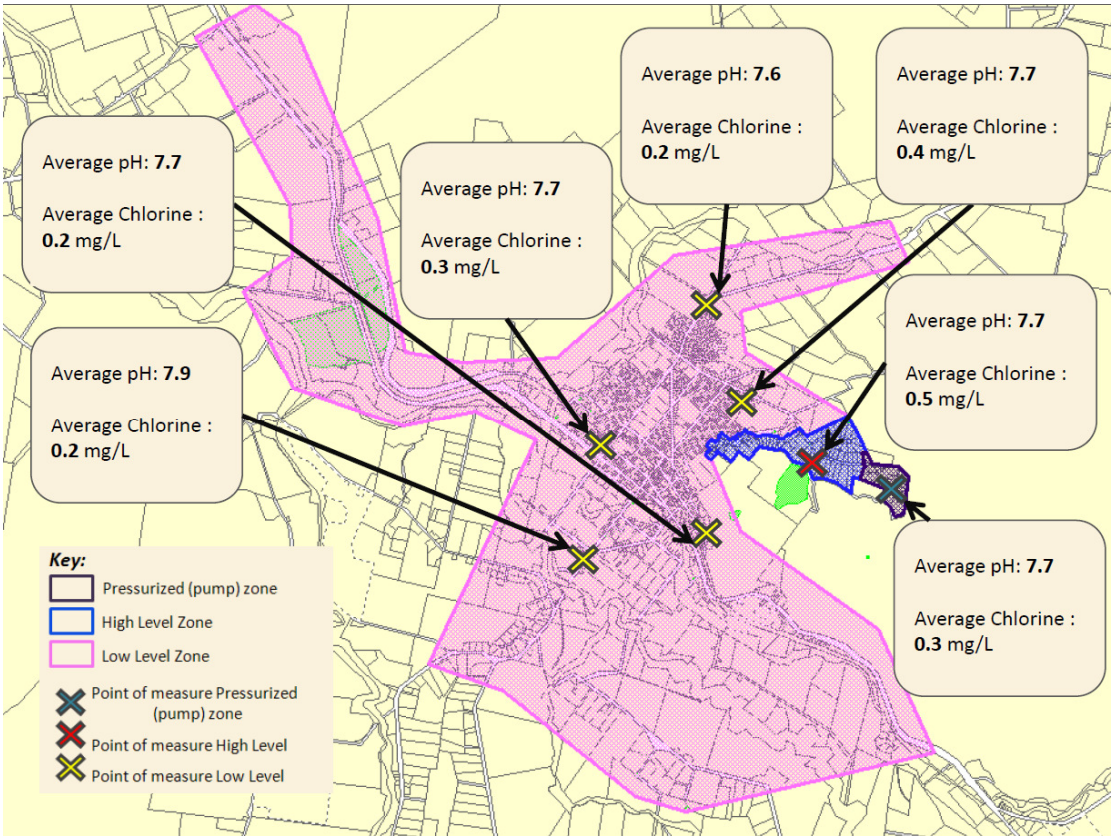

Figure 2: ***Reticulation map, showing water quality results since the introduction of changed drinking water supply***

2.4 Recognition

The Community Reference Group was invited to a tour of the new plant prior to the official opening which gave both sides a chance to reflect on the journey. It was a surprise to the Group the amount of material removed from the water, which was particularly obvious in the DAF float. This tour also highlighted the additional time and operator skill required to ensure the plant was delivering compliant drinking water.

For the official WTP opening ceremony, the invitation was extended to the general public and the Community Reference Group. As part of the proceedings a representative of the Community Reference Group spoke, thanking NEW for giving the Group the chance to be part of the planning and implementation of such an important infrastructure project for the town. It was also noted by the Water Minister that NEW had set a benchmark for community consultation through this project.

3.0 CONCLUSIONS

Although the water treatment plant has been operating for nearly one year, the Community Reference Group keeps a close eye on the water quality and continues to give operations staff feedback on the quality!

I believe that this case study demonstrates that by using a Community Reference Group as a resource for water quality projects can result in positive outcomes for the Water Corporation and the Community.

The supply of water of a high standard and the promotion of the partnership between NEW and the Community Reference Group is displayed in a town monument. A drinking fountain has been installed in a new park development in the centre of the Myrtleford township. It promotes Myrtleford's water supply as one of a pristine and of the highest quality. This monument is used as a draw card in promoting Myrtleford as a tourist destination which will benefit the community as a whole

In using the Community reference group to table the concerns of the residents, NEW has been able to build a state-of-the-art plant that treats water that both achieves regulatory requirements, and meets the expectation of the majority of the residents.

We all need to remember that without the support of the communities we serve, we will not be valued as a service provider whether our product is safe or not.

4.0 ACKNOWLEDGEMENTS

Key people that need to be recognised through the journey of the Myrtleford drinking water supply include:

- Artur Majerowoski – Principal Engineer, MJM Environmental P/L
- David Sheehan & Leanne Wells from the Department of Health
- NEW staff, in particular the Myrtleford Operations Team and our Treatment Technology Team,

  and of course:
- Myrtleford Community Reference Group