

# CLEAR WATER TANK CAPERS: AN OPERATOR'S VIEWPOINT



*Paper Presented by:*

**Travis Hutton**

*Author:*

**Travis Hutton, Process Operator Trainee,**

Tamworth Regional Council



*10<sup>th</sup> Annual WIOA  
NSW Water Industry Operations Conference and Exhibition  
Newcastle Jockey Club,  
6 to 7 April, 2016*

# CLEAR WATER TANK CAPERS: AN OPERATOR'S VIEWPOINT

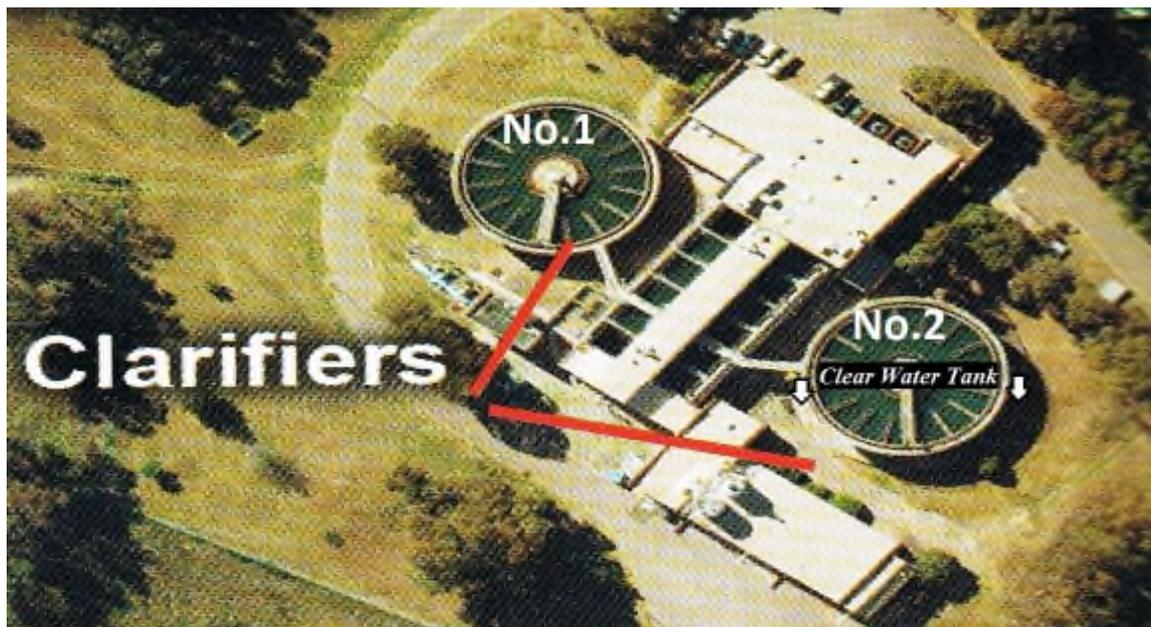
**Travis Hutton**, *Process Operator Trainee*, Tamworth Regional Council

## ABSTRACT

Tamworth Regional Council authorised a routine inspection and cleaning of the Clear Water Tank and Reservoirs by professional divers who discovered a serious problem. Raw sludge was draining directly into the Clear Water Tank and required immediate attention. Our primary concern was to make certain that the water was safe for the community. There were many challenges to overcome and decisions to be made. A temporary repair was completed to allow time for further investigations into the best way to make the necessary repairs. Due to the limited storage capacity of Tamworth's water supply, time was critical. Strategies were discussed and put into place to rectify this predicament. It appears a design flaw was the cause of this major problem. There have been many discussions about operational procedures and practical steps to limit any future problems.

## 1.0 INTRODUCTION

Our discussion will be focused on a design flaw and the consequence of that design flaw. Clarifier No. 2 is directly above the Clear Water Tank; its sludge drainage pipe work is directly inside the Clear Water Tank.



**Figure 1:** *Calala Water Treatment Plant (Tamworth)*

## 1.1 About Tamworth

The Tamworth Region covers 9,653.25 square kilometres, with a population of over 58,000. From the Nandewar Range north of Barraba, to the head of the Peel River and the Great Dividing Range, Tamworth Region is one of the most progressive and exciting places in inland Australia. Approximately three quarters of the region's population lives within the city of Tamworth with the balance residing in the surrounding areas. Tamworth is the major business centre of the North West and New England Region of NSW.

It is widely known as the Country Music Capital of Australia, and attracts some 50,000 visitors every January to the festival. In 2008, Tamworth opened its doors to a \$30 million world-class Australian Equine and Livestock Events Centre (AELEC) which now attracts some of Australia's most action packed equine events.

## 1.2 Water Supplies

Tamworth's water supplies are drawn from a combination of two dams, and a series of wells. Clean water is supplied to the region through a careful treatment process at the major Calala Water Treatment Plant in Tamworth and local treatment facilities in the towns and villages.



**Figure 2:** *Dungowan Dam at 100% Capacity*

## 1.3 Calala Water Treatment Plant (Tamworth)

The Calala Water Treatment Plant was constructed at a cost of almost \$6.9 million by the Department of Public Works. The plant was commissioned in 1980 and considered to be 'state of the art' at that time.

## 1.4 Water Storage Capacity

Tamworth's water storage is comprised of 18 interconnected reservoirs with a total capacity of approximately 100 megalitres. 100 megalitres should supply the city for 1 to 2 days if required (during normal consumption).

## 2.0 DISCUSSION

Professional divers were engaged to undertake a routine inspection and cleaning of TRC's Clear Water Tank and Reservoirs. During the inspection of TRC's Clear Water Tank, they discovered a serious problem that required immediate attention. There was raw sludge draining from Clarifier No. 2 directly into the Clear Water Tank.

## 2.1 Many Questions

At this point, there were many questions. Why was this sludge leaking into the clear water tank? How long had this been happening? Could we have found this sooner? Was prevention possible? Had the quality of the water supplied to Tamworth residents been compromised? Did we need to issue a boiled water notice to the public?

The Clear Water Tank needed draining and the sludge leak needed stopping immediately. There were many decisions required. It had been ten years or more since opening the scour valve for the Clear Water Tank, would opening the valve be wise? We needed to know where valves were and where they drained. This knowledge was with people that had moved on; we then had to find plans of the plant to work it out.

Public safety was the major concern, therefore senior staff were considering whether it may be necessary to issue a boiled water notice. After thorough reassessment it was deemed the risk was very low and therefore it was unnecessary to issue a boiled water notice.



**Figure 3:** *Clear Water Tank Scouring Valve*

## 2.2 Temporary Repair

Scouring of the Clear Water Tank was initiated, but it was soon discovered that the scouring pipe was blocked. (Later we found that tree roots had almost completely blocked the 200mm diameter pipe.)

The next option was to hire two large pumps that would quickly drain the Clear Water Tank. These two pumps were not in Tamworth and time was ticking. Tamworth's water reserves were dropping. The only option left was to drain the clarifier and place a blanking plug over the offending sludge port, as our first priority was to stop the sludge leak. This would only be a short-term fix, and would ultimately buy us valuable time - time to plan a permanent fix.

The engineers and team leaders began days of planning. They had a strong focus on safety for Tamworth's water supply and all the workers that would be required.

### 2.3 Repair

Firstly, the Clear Water Tank needed draining, but the scouring drainpipe was blocked and required repair. We used an inspection robot with a tethered controller to find out what the blockage was in the pipe. There was a large clump of tree roots near a damaged section of the pipe. This was only a few meters away from the Clear Water Tank.

We used underground locator equipment to find the depth and approximate position. The indicated depth below the surface was over 6 meters. That required a large 30 tonne excavator and shoring would be necessary to keep the workers safe, when down in the hole.

The excavation began of the blocked and damaged pipe. Digging was fast with the 30 tonne excavator. When the pipe was located, they lowered the shoring into place then the workers climbed down to start the repair.

The pipe contained asbestos, this needed removing safely and in the correct manner. We contracted a local plumber who would follow industry best practice in removal of the asbestos.

Now it was time to lower into place the new section of pipe along with two gibaults. Once the repair was finished we opened the scouring valve to test for leaks. The repair was successful.



**Figure 4:** *Repaired Clear Water Tank Scouring Pipe*

After the Clear Water Tank scouring pipe was repaired, the tank needed draining. There were many other challenges that had to be overcome, being below ground level yet working at a height of 6 metres, all repair tools (laser level, low voltage lighting, Genie lifters and scaffolding) and materials had to be lowered into one small opening.



**Figure 5:**     *Repairing Pipe inside Clear Water Tank*

Significant consideration and planning was required to ensure efficient and safe work in a confined space. Chlorine and carbon monoxide monitors also needed to be in place. Another major consideration was the limited time we had to complete the works, due to Tamworth's limited water storage capacity. Following the correct plant isolation protocols would ensure the safety of all workers. If any other major problems were discovered, they had contingency plans in place.

### **3.0 CONCLUSION**

In my opinion this major problem was ultimately caused by a design flaw. Placing a clarifier on top of a Clear Water Tank with the benefit of hindsight is clearly a bad idea. Another problem was that the original sludge pipe had insufficient support to carry the weight of the pipe.

One outcome of this event is to implement regular exercising of valves and a better way to retain information and knowledge from all staff.

The successful outcome was due largely, to the expertise of the fitters and the equipment they employed in the repair process. All team members willingly worked long hours to complete the job quickly and safely in an efficient manner. Thanks to the planning of our engineers and team leaders, we had no incidents and the repair was a great success.



**Figure 6:**     *Clarifier at Calala Water Treatment Plant (Tamworth)*

#### **4.0    ACKNOWLEDGEMENTS**

Many thanks to those who helped me write this paper, for supplying ideas and information.

Rose Perrott (Headworks Engineer - Water and Waste Operations)  
Adrian Cameron (Team Leader - Water Headworks)  
Ricky Hannaford (Process Operator)  
Leonie Hutton (My Wife)  
Sally West (Friend)

#### **5.0    REFERENCES**

Tamworth Regional Council 'Towns and Villages' 25 January 2016  
<http://www.tamworth.nsw.gov.au/Towns-and-Villages/default.aspx>

Tamworth Regional Council 'Water Supplies' 27 January 2016  
<http://www.tamworth.nsw.gov.au/Water-and-Sewerage/Water-Supplies/Water-Supplies/default.aspx>