

4.0 Production, Transmission & Distribution System

The North Tyndal Wellfield is located 15 km North of the Town of Amherst. The pumps at the wellfield are three 60 hp pumps and one 75 horsepower pump. The pumps at the wellfield are designated p-1 to p-4. Please see Figure 2.

The North Tyndal Wellfield was constructed between 1991 and 1993 and was commissioned into service on October 21, 2003.

Production Wells General

Well	HP	Pumping Capacity	Figure	Pump Manufacturer
P-1	60	2600 LPM	3	Berkley
p-2	60	2000 LPM	4	Pluger
p-3	60	2000 LPM	5	Pluger
p-4	75	1800 LPM	6	Pluger

Table 1. Production Wells General

Each well is installed with 12 meters of steel casing and a “driveshoe” from the surface to bedrock. Each well was drilled to a diameter of 30cm to a depth of 45 meters. Inside the 30cm bore hole was installed a 25cm slotted schedule 40 pvc casing. The slotted section of the casing is located in the water bearing formations of the bedrock. Inside the slotted pvc casing the pump has been installed on a 6” PVC “Certalok” riser pipe. The pump is attached to the bottom of the riser pipe.

The riser pipe terminates inside a below grade concrete pit. Access is provided to the pit by climbing down a galvanized steel ladder. The entry into the pit is secured using a “Bilco” hatch. The top of the riser pipe there is a 150 mm stainless steel 90° elbow into a Ross control valve. Designed to control back pressure and eliminate dangerous pressure waves from entering the distribution system from the pumps.



Figure 3

A pipe connected to the Ross Control valve allows the water to flow through a magnetic meter which measures the amount of water being pumped into the system. This information is transmitted from the meter to the RTU (Remote Terminal Unit). From the RTU information is transmitted along telephone lines to the SCADA control computer located at the Works Garage in Amherst.

All of the Production Well Pits are connected to a transmission/distribution main which directs the water to the Chlorine Building.

Water comes into the building via the 400 mm main. Some of the water is directed into booster pumps which raise the pressure from approximately 100 psi to 150 psi. This water passes through a Chlorine anti siphon injector and the friction of the water passing through the injector causes chlorine gas to be injected into the water. The amount of the chlorine injected is controlled by a "Closed Loop System" which works in conjunction with a Chlorine residual analyzer.



Figure 4

The Residual Analyzer is a Severn Trent Services Capital Controls Series CL500. Chlorinated water from the main is piped back to the analyzer and the residual chlorine is measured. This piece of equipment measures the chlorine residual continuously and transmits the information to the SCADA system and the Closed Loop System. The Analyzer measures the "Free" Chlorine in the system. The Analyzer is calibrated monthly using a portable digital calorimeter.

Chlorine Closed Loop System

The closed Loop system is a Severn Trent Services Wall Cabinet Series WX4100 from Capital Controls. This system receives the transmitted signal from the Residual Analyzer and then determines if the chlorine gas control valve needs to be open or closed. The Closed loop system is currently set to check the value of the residual Chlorine at operator set intervals. The system then adjusts the Chlorine injector valve opening. This system works reasonably well at maintaining a constant Chlorine residual in the system.



Figure 5

The Chlorine Gas is stored in 150 lb cylinders in a separate room complete with separate ventilation and gas leak monitoring system from the rest of the building. In addition to the two cylinders that are connected to the injection system, the Town stores up to five spare cylinders. Therefore there usually is a total of seven cylinders stored at the Wellfield Chlorine Building.



Figure 6

Chlorine Building Safety Equipment

Two sets of self contained breathing apparatus SCBA is stored at the Wellfield. According to our safety procedures at any time that our Operators are activating the valves on the chlorine gas the SCBA must be used. Each SCBA has a 30 minute duration tank. In addition to the 30 min tank there are three large extended time tanks for the SCBA these tanks of breathing air making up a "cascade" system. This cascade system can be connected to the SCBA by 15 meter long connection hoses. This will allow crews to work for extended periods of time in case of a leak in the gas system.

Located in the gas storage room is a chlorine gas monitor from capital controls. This monitor constantly monitors the air for the presence of chlorine gas. If chlorine is detected an alarm rings in the main room of the chlorine building and a separate alarm is generated on the SCADA system.

