

# Well System Evaluation

by Carson Dunlop



**123 Any St., Townsville**

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BCIN 45402 (House 2012, Onsite Sewage Systems)  
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## Overall Summary

Overall, the bored well system appears to be in good working condition. However, the water sample upstream of any treatment equipment tested positive for total coliform bacteria. For health reasons, a modern drilled well is recommended. In the short term, regular well shocking (chlorination of well water) and maintenance of the UV light system is recommended which includes yearly replacement of the UV lamp. Installation of an RO (Reverse Osmosis) system is also recommended for drinking water at the kitchen sink. Regular well water testing is also recommended.

The concrete lid over the well should also be more water tight as it does not fit tightly allowing contamination to enter from the top.

The Draw Down of the well was quite high, meaning that the recovery rate of the well was slow (1.5 gallons per minute) while running water in the home. Running out of water may be an issue with this well, especially in the summer and fall seasons.

A larger pressure tank is recommended in the basement. A larger tank will prevent the jet pump from short cycling (turning on and off too quickly).

## Site Conditions

Conditions at the time of the inspection were clear and dry. The outdoor temperature was approximately 4 deg. C

## Well Record

A well record could not be found for this well, which is common for older wells. The well record is a document produced by the well installer and submitted to the Ministry of the Environment at the time of installing the well. A well record contains useful information including the soil conditions, water level and the recommended pump sizes.

## Bored Well (often referred to as a dug well)

The well is located at the east side of the property north of the house and south of the barn.



**Figure 1: Bored Well (Lid Installed)**



***Figure 2: Looking down the well (Note that any replacement of these components will be difficult)***

Bored wells are vulnerable to surface contamination and running out of water. The lid of the well has been damaged and could lead to surface contamination. Upgrading to a modern drilled well is recommended. Drilled wells can deliver more water and cleaner water since the water is coming from a deeper ground level, often from an aquifer.



***Figure 3: Well cover has been damaged***

## Draw Down and Recovery

The purpose of the draw down and recovery test is to check the likelihood of the well running dry during regular operating conditions. It also determines the ability of the well pump to keep up with household water demand.

By modern standards, a well and well system components should be able to deliver a minimum of 3 gallons per minute of water in the home.

### Procedure`

1. The initial water level in the well was measured at 93.5 inches below the well lid.
2. Several fixtures in the home were run totalling 3.75 gallons per minute of water usage. The fixtures were run for approximately 2 hours. In total 490 gallons of water were run through the well system components.
3. It was observed that the jet pump in the basement was able to keep up with this demand, by observing that the pump would turn on and turn off at the cut in and cut out pressures (35 psi and 50 psi).
4. The final water level in the well was 133 inches meaning that the water level decreased by 39.5 inches. The inside well diameter is 48 inches. Therefore, the well lost 309.5 gallons of water during the test. Since 490 gallons were used in the home, and the well lost 309.5 gallons, that means that the well recovered 180.5 gallons over the 2-hour test. This equates to be a recovery rate of approximately 1.5 gallons per minute which is considered low (3 gallons per minute is considered minimum for modern household water usage)
5. In conclusion, the well jet pump can supply well over 3 gallons per minute of water in the home, the well will recover only 1.5 gallons per minute thereby possibly leading to the well running dry.
6. Note that this test is dependent on the time of the year. The static water level in the well will decrease in the summer and fall causing the likelihood of the well running dry to increase.

## Well System Components

Inside the home, the well system consists of a jet pump, pressure switch and a pressure tank, a water softener and a UV light system.



**Figure 4: Jet Pump (left), Pressure tank (blue tank), Pressure Gauge and Switch (behind pump)**

The cut-in pressure for the pump (well pump turns on) was 35 psi and the cut-out pressure (well pump turns off) was 50 psi. Both values are acceptable for a well pump system.

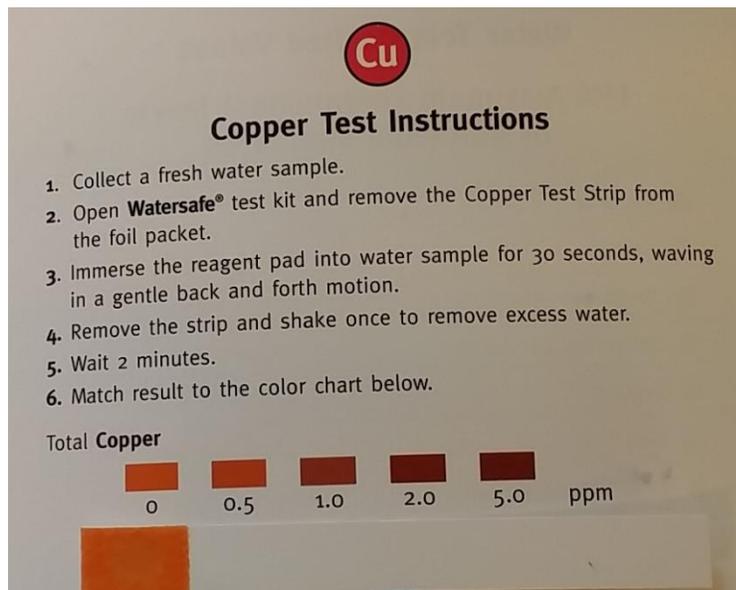


**Figure 5: Water Softener (Left) and UV Light System (Right)**

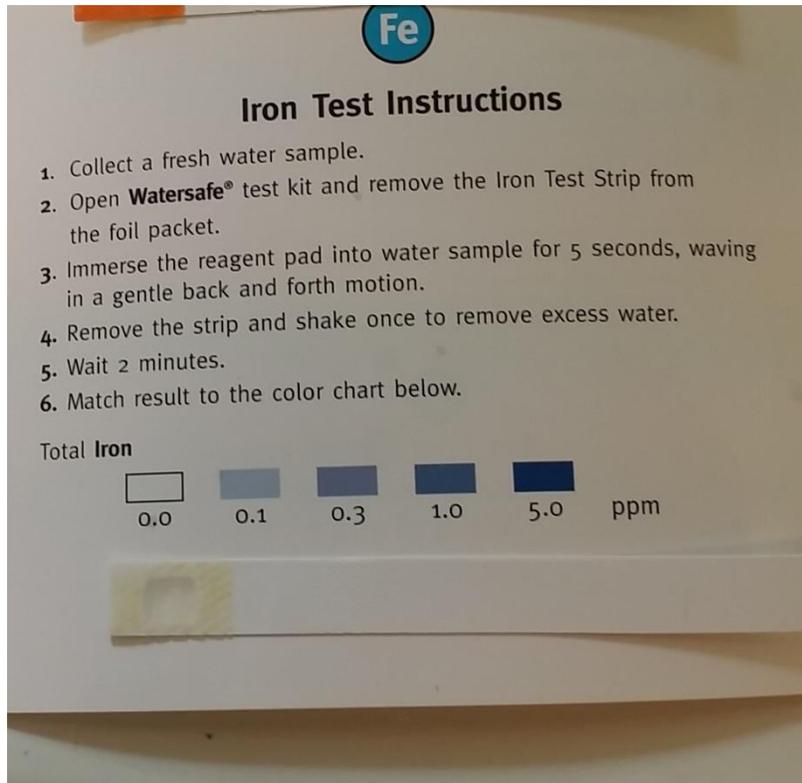
## Well Water Testing

A water sample was taken at the pressure tank (before any of the water treatment equipment) and sent to an independent laboratory for bacteria testing. The results of this test were high in total coliform bacteria. The results are shown in the Appendix of the Home Inspection Report, submitted under separate cover.

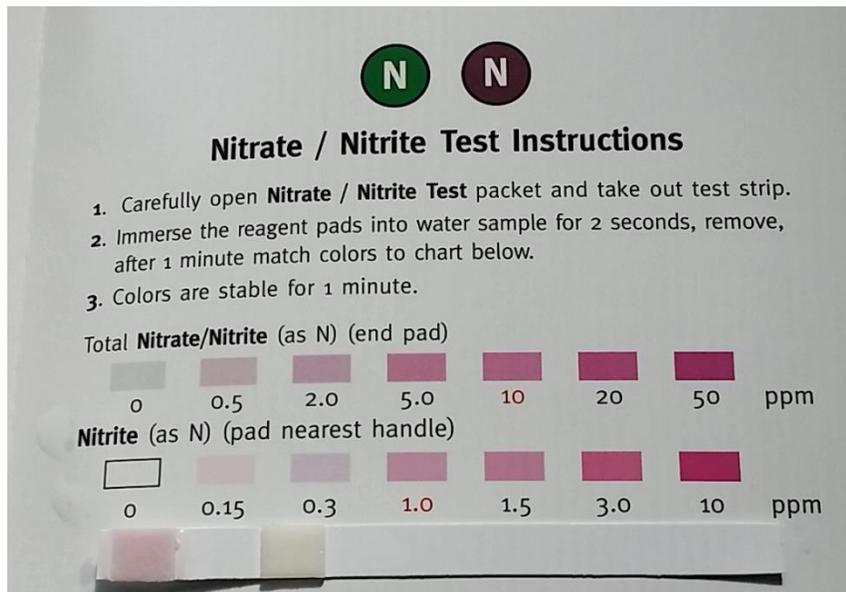
A Watersafe Test Kit from Silver Lake Research Laboratories was also used to test water chemistry. This test was conducted after the water treatment equipment. This test also showed NEGATIVE for bacteria which shows that the UV light system is effective in killing bacteria. The test for total nitrite/nitrate was slightly high and the pH was high (alkaline). In addition, other parameters were tested as shown in the figures below.



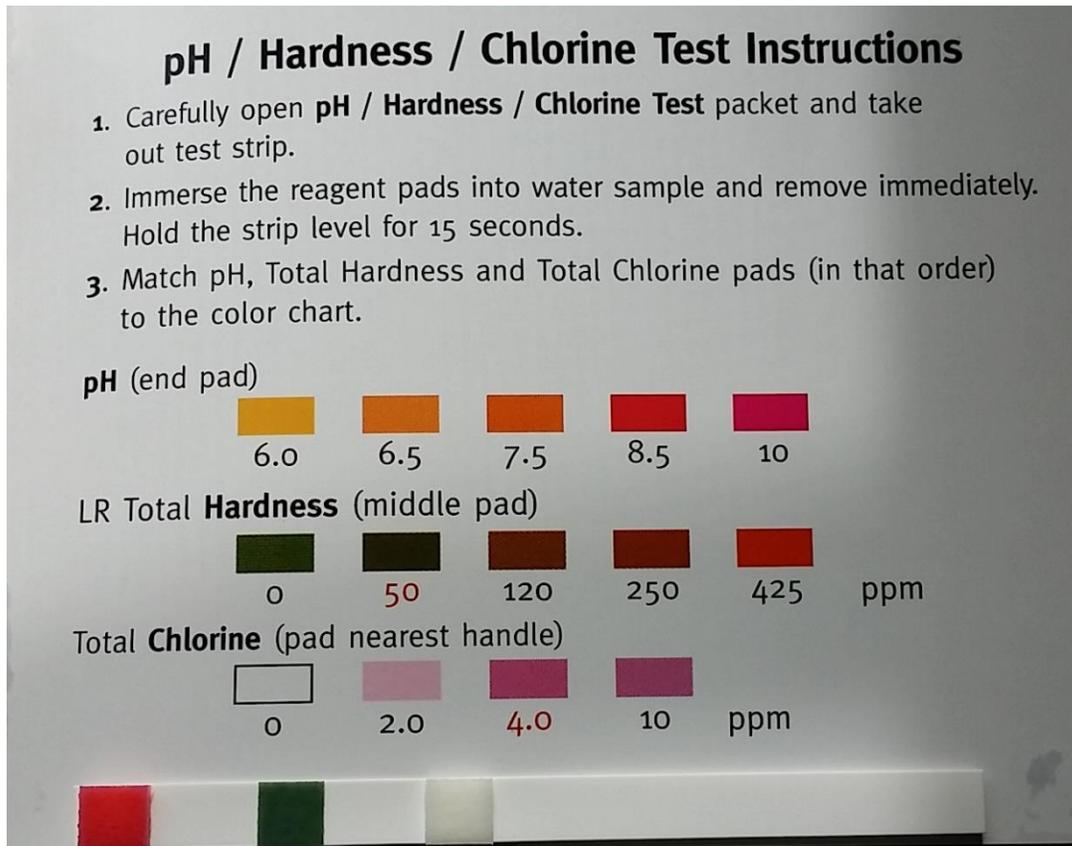
**Figure 6: Watersafe Copper Test showing 0 ppm**



**Figure 7: Watersafe test for Iron showing 0 ppm**



**Figure 8: Watersafe for Nitrate/Nitrite Test showing elevated Total Nitrate/Nitrite**



**Figure 9: Watersafe test showing pH of approximately 9, Total hardness of 0, and 0 ppm of chlorine (High pH should be investigated further)**



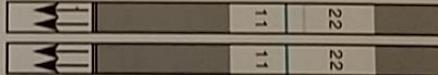
## Lead / Pesticide Test Instructions

The **Watersafe® Lead Test** can detect dissolved lead at levels below the EPA Action level of 15 parts per billion (ppb). The **Watersafe® Pesticide Test** detects two of the most common pesticides used in the US at or below the EPA Maximum Contaminant Level (atrazine - 3 ppb, and simazine - 4 ppb).

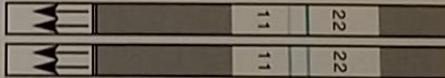
1. Open **Lead / Pesticide** packet and take out all contents.  
The packet contains a test vial, a dropper pipette, two **Watersafe®** test strips, and a desiccant (to be discarded).
2. Using dropper, place **exactly TWO dropper-fuls** of water sample into test vial. To pick up sample, tightly squeeze the bulb at the end of the dropper and place the open end into water sample. Release the bulb to pick up sample, then squeeze again to expel sample into vial.
3. Swirl vial gently for several seconds. Place on a flat surface.
4. Place both test strips into the test vial, with arrows pointing **DOWN**.
5. Wait 10 minutes. Do not disturb strips or vial during this time. Blue lines will appear on the strips.
6. Take the strips out of the vial and lay them on a flat surface with the arrows pointing to the **LEFT**. Read results.

**Negative:** LEFT line (next to number 1) is darker than the RIGHT line (next to number 2).

If you only see one line next to number 1, the test is negative.

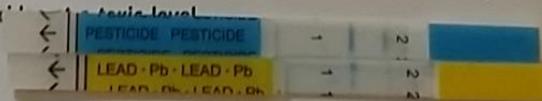


**Positive:** RIGHT line (next to number 2) is darker than LEFT line (next to number 1), or lines are equally dark (Both LEFT and RIGHT lines are equally dark)



7. Note: If no lines appear, or both lines are very light, the test did not run properly and the result is not valid.

If a test strip shows a positive result, your water sample may contain lead or pesticide.



**Figure 10: Watersafe Lead and Pesticide Test showing Negative Results**

End of Report