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Richard Cropper III

Attn : Richard Cropper III

KAR Project No. : 600311

Date Reported : 01/15/16

Date Activated : 01/13/16

Date Due : 01/15/16

Date Validated : 01/15/16

Project

Description : Analysis of drinking water from Kit 60

Dear Client,

The laboratory analysis of your water is presented in the attached report. The purpose of this testing was to screen for key indicators of water quality, both quickly and at a low cost. This report cannot be used for Safe Drinking Water Act regulatory compliance purposes because it does not fully comply with all of the U.S. EPA regulations, mainly in the area of sample collection.

The "Comments" column of the report contains helpful guidelines for interpreting the results. Maximum Contaminant Levels (MCL's) established by the USEPA are included for regulated substances. Certain MCL's protect health and should not be exceeded. Other MCL's indicate aesthetic water qualities such as taste, odor, or color; and these values are enclosed in brackets [].

The extremely low cost of our water sampling kit does not include a professional one-on-one consultation discussing specific water problems or health concerns you may be experiencing. We suggest you visit the USEPA water website at <http://water.epa.gov/drink/>, or contact your local Public Health Department for information specific to your water supply. Always talk to your doctor about health concerns, and show him this report. If you would like additional testing of your water, please contact our Client Service Department. Thank you for the opportunity to serve you!

Respectfully submitted by

The professional staff at KAR Laboratories, Inc.

KAR Laboratories, Inc. maintains Full Certification status for Bacteriology, Inorganics, Regulated Organics and Synthetic Organics through USEPA, Michigan Department of Public Health and Indiana State Department of Health. This report is not to be used for the purpose of regulatory compliance due to sampling limitations and may only be reproduced in full and never without the expressed consent of the owner of the data, **Richard Cropper III**.

DRINKING WATER LABORATORY REPORT

Client: **Richard Cropper III**

KAR Project No. : **600311**

Date Reported: **01/15/16**

Analysis of drinking water from Kit 60

Sample ID : <u>"Pole barn well-bypass softener"</u>	
Sampled By : Richard Cropper III	Date Received : 01/13/16
Sample Date : 01/10/16	Sample Type : domestic
Sample Time : 1341	KAR Sample No. : 600311-01W

Test	Result	Units*	Method	Analyzed	Comments	Explanation
Prep. 1631	Completed		EPA 1631E	01/14/16 JHB		
Water Test Kit-Metals (MS)	See below		EPA 200.8	01/15/16 NHM		
Water Test Kit-Metals (OES1)	See below		EPA 200.7	01/14/16 JHB		
Water Test Kit-Metals (OES2)	See below		EPA 200.7	01/13/16 JHB		
Aluminum, total	<0.1	mg/L	EPA 200.7	01/14/16 JHB	MCL**=[0.050 mg/L]	None found (acceptable result)
Antimony, total	<0.005	mg/L	EPA 200.8	01/15/16 NHM	MCL**=0.006 mg/L	None found (acceptable result)
Arsenic, total	<0.002	mg/L	EPA 200.8	01/15/16 NHM	MCL**=0.01 mg/L	None found (acceptable result)
Barium, total	0.10	mg/L	EPA 200.7	01/14/16 JHB	MCL**=2 mg/L	
Beryllium, total	<0.002	mg/L	EPA 200.8	01/15/16 NHM	MCL**=0.004 mg/L	None found (acceptable result)
Bismuth, total	<0.1	mg/L	EPA 200.7	01/13/16 JHB		None found (acceptable result)
Boron, total	0.14	mg/L	EPA 200.7	01/13/16 JHB		
Cadmium, total	<0.001	mg/L	EPA 200.8	01/15/16 NHM	MCL**=0.005 mg/L	None found (acceptable result)
Calcium, total	4.9	mg/L	EPA 200.7	01/14/16 JHB		
Cerium, total	<0.005	mg/L	EPA 200.8	01/15/16 NHM		None found (acceptable result)
Cesium, total	<0.02	mg/L	EPA 200.8	01/15/16 NHM		None found (acceptable result)
Chromium, hexavalent	<0.01	mg/L	EPA 200.7	01/14/16 JHB		None found (acceptable result)
Chromium, total	<0.01	mg/L	EPA 200.7	01/14/16 JHB	MCL**=0.1 mg/L	None found (acceptable result)
Cobalt, total	<0.02	mg/L	EPA 200.7	01/14/16 JHB		None found (acceptable result)
Copper, total	<0.02	mg/L	EPA 200.7	01/14/16 JHB	MCL**=1.3 mg/L	None found (acceptable result)
Gallium, total	<0.02	mg/L	EPA 200.7	01/13/16 JHB		None found (acceptable result)
Gold, total	<0.02	mg/L	EPA 200.8	01/15/16 NHM		None found (acceptable result)
Indium, total	<0.02	mg/L	EPA 200.8	01/15/16 NHM		None found (acceptable result)
Iron, total	1.16	mg/L	EPA 200.7	01/14/16 JHB	MCL**=[0.3 mg/L]	
Lead, total	<0.003	mg/L	EPA 200.8	01/15/16 NHM	MCL**=0.015 mg/L	None found (acceptable result)
Lithium, total	<0.05	mg/L	EPA 200.7	01/14/16 JHB		None found (acceptable result)
Magnesium, total	1.6	mg/L	EPA 200.7	01/14/16 JHB		
Manganese, total	0.031	mg/L	EPA 200.7	01/14/16 JHB	MCL**=[0.05 mg/L]	
Mercury by EPA 1631	<0.025	ug/L	EPA 1631E	01/14/16 JHB	MCL**=2 ug/L	None found (acceptable result)
Molybdenum, total	<0.02	mg/L	EPA 200.7	01/14/16 JHB		None found (acceptable result)
Nickel, total	<0.02	mg/L	EPA 200.7	01/14/16 JHB	MCL**=0.1 mg/L	None found (acceptable result)
Niobium, total	<0.05	mg/L	EPA 200.8	01/15/16 NHM		None found (acceptable result)
Phosphorus, total, by ICP	<0.5	mg/L	EPA 200.7	01/13/16 JHB		None found (acceptable result)
Potassium, total	2.1	mg/L	EPA 200.7	01/14/16 JHB		
Selenium, total	<0.005	mg/L	EPA 200.8	01/15/16 NHM	MCL**=0.05 mg/L	None found (acceptable result)
Silver, total	<0.005	mg/L	EPA 200.8	01/15/16 NHM	MCL**=[0.1 mg/L]	None found (acceptable result)
Sodium, total	10.4	mg/L	EPA 200.7	01/14/16 JHB	MCL**=[20 mg/L]	
Strontium, total	<0.1	mg/L	EPA 200.7	01/14/16 JHB		None found (acceptable result)
Sulfur, total, by ICP	0.5	mg/L	EPA 200.7	01/13/16 JHB		
Tantalum, total	<0.05	mg/L	EPA 200.8	01/15/16 NHM		None found (acceptable result)
Thallium, total	<0.002	mg/L	EPA 200.8	01/15/16 NHM	MCL**=0.002 mg/L	None found (acceptable result)
Thorium, total	<0.02	mg/L	EPA 200.8	01/15/16 NHM		None found (acceptable result)
Tin, total	<0.1	mg/L	EPA 200.7	01/13/16 JHB		None found (acceptable result)
Titanium, total	<0.01	mg/L	EPA 200.8	01/15/16 NHM		None found (acceptable result)
Tungsten, total	<0.05	mg/L	EPA 200.8	01/15/16 NHM		None found (acceptable result)
Uranium, total	<0.02	mg/L	EPA 200.8	01/15/16 NHM	MCL**=30 ug/L	None found (acceptable result)
Vanadium, total	<0.02	mg/L	EPA 200.8	01/15/16 NHM		None found (acceptable result)
Zinc, total	<0.02	mg/L	EPA 200.7	01/14/16 JHB	MCL**=[5 mg/L]	None found (acceptable result)
Zirconium, total	<0.05	mg/L	EPA 200.7	01/13/16 JHB		None found (acceptable result)
Bacteria, E. coli	Negative		SM 9223 B	01/13/16 EIF		Negative indicates this bacteria was not detected by this screening method.

"<" (less than sign) indicates NOT FOUND. The number to the right of "<" is the lowest concentration that the test can detect (the reporting limit)

** please refer to Page 1 for more information

***Units of Measure**

mg/L is milligrams per liter (ppm)	ppb is parts per billion
ug/L is micrograms per liter (ppb)	gpg is grains per gallon
ppm is parts per million	S.U. is Standard Units
ppt is parts per thousand	

DRINKING WATER LABORATORY REPORT

Client: *Richard Cropper III*

KAR Project No. : **600311**

Date Reported: **01/15/16**

Analysis of drinking water from Kit 60

Sample ID : **"Pole barn well-bypass softener"**

Sampled By : *Richard Cropper III*

Date Received : **01/13/16**

Sample Date : **01/10/16**

Sample Type : **domestic**

Sample Time : **1341**

KAR Sample No. : **600311-01W**

Test	Result	Units*	Method	Analyzed	Comments	Explanation
Bacteria, total coliform	Negative		SM 9223 B	01/13/16 EIF		Negative indicates this bacteria was not detected by this screening method.
Alkalinity (as CaCO ₃)	8	mg/L	SM 2320 B	01/13/16 AJK		
Bicarbonate (as CaCO ₃)	8	mg/L	SM 2320 B	01/13/16 AJK		
Bromide	<0.1	mg/L	EPA 300.0A	01/14/16 ALK		None found (acceptable result)
Carbonate (as CaCO ₃)	<0.02	mg/L	SM 2320 B	01/13/16 AJK		None found (acceptable result)
Chloride	15.9	mg/L	EPA 300.0A	01/14/16 ALK	MCL**=[250 mg/L]	
Conductivity	117	micromhos/cm	EPA 120.1	01/13/16 BAW		
Corrosivity, Langelier Index	-3.9	S.U.	SM 2330 B	01/15/16 AJK		
Corrosivity, Ryznar Index	13.6	S.U.	SM 2330 B	01/15/16 AJK		
Fluoride	<0.1	mg/L	EPA 300.0A	01/14/16 ALK	MCL**=4 mg/L [2]	None found (acceptable result)
Hardness	19	mg/L (as CaCO ₃)	SM 2340 B	01/14/16 JHB		
Hardness (gpg)	1.1	grains/gallon	SM 2340 B	01/14/16 JHB		
Nitrogen, nitrate	4.7	mg/L	EPA 300.0A	01/14/16 ALK	MCL**=10 mg/L	
Nitrogen, nitrite	<0.1	mg/L	EPA 300.0A	01/14/16 ALK	MCL**=1 mg/L	None found (acceptable result)
PH	5.8	S.U.	SM 4500-H B	01/13/16 AJK	MCL**=6.5-8.5su	
Salinity	0.055	ppt	SM 2520 B	01/13/16 AJK		
Silica	23.9	mg/L	EPA 200.7	01/13/16 JHB		
Sulfate	1	mg/L	EPA 300.0A	01/14/16 ALK	MCL**=[250 mg/L]	
Tot. diss. solids, estimated	78	mg/L	EPA 120.1	01/13/16 AJK	MCL**=[500 mg/L]	

This report is informational and is not intended for use in SDWA regulatory compliance testing.

"<" (less than sign) indicates NOT FOUND. The number to the right of "<" is the lowest concentration that the test can detect (the reporting limit)

** please refer to Page 1 for more information

***Units of Measure**

mg/L is milligrams per liter (ppm)	ppb is parts per billion
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ppt is parts per thousand	

KAR Laboratories, Inc.

DESCRIPTION OF TESTS AND IF NECESSARY, TREATMENT

Always consult your doctor for health-related issues and bring along your Analytical Report. Please refer to the body of our Analytical Report for U.S. EPA Maximum Contaminant Levels and how they relate to YOUR water sample. Primary MCLs (example: MCL=0.5ug/L) should NOT be exceeded. Secondary MCLs are indicated on your report in brackets (example: MCL=[0.5ug/L] and are non-health related which were set for aesthetic reasons (taste, color, iron staining, water spotting, etc.). Below is information based upon common questions we get:

Bacteria, E. coli and total Coliform These bacteria come from human and animal wastes and are found throughout the environment. Most coliform bacteria are not a health threat, but some strains are pathogenic. Testing for Coliforms is used to indicate whether other potentially harmful bacteria may be present. Kitchen faucets with an aerator screen, infrequently used faucets, and outdoor faucets are more prone to grow bacteria. It is not uncommon for the sample to become contaminated by touching the threads on the vial and/or placing the cap on a countertop. Chlorination/flushing of the well and plumbing system will help reduce or eliminate the bacteria. Most public water systems maintain a low concentration of chlorine to control bacteria.

Nitrate The largest use of nitrates is in fertilizer. In the body, nitrates are converted to nitrites. Infants below six months of age who drink water containing nitrate in excess of the maximum contaminant level (MCL) could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue baby syndrome. The long-term effects of Nitrate on adults is still being studied.

Lead A very common and quite toxic contaminant in many drinking waters that we test. Usually attributable to plumbing. The USEPA Primary Drinking Water limit is 0.015mg/L (15ug/L).

Fluoride Fluoride is naturally present in some water. Community water fluoridation is the adjustment of the natural fluoride level in public water systems to an optimal level to prevent tooth decay. It's a very low parts-per-million concentration (ppm). We've seen one case of over-fluorination that caused stomach illness to children at an elementary school and the neighborhood. The use of fluoride has been controversial for several decades.

Corrosivity, Langelier Saturation Index A negative value indicates the water will tend to be corrosive in the distribution system. A positive value indicates the water will tend to deposit calcium carbonate forming scales in the distribution system. If the Langelier Index is close to zero, then the water will neither be strongly corrosive nor scale forming.

Ryznar Stability Index A value of 6 or less indicates a tendency to form scale. A value 8 or more indicates a tendency to corrode metal. A value near 7 (neutral) may be slightly scale-forming or corrosive. A thin coating of scale inside a metal pipe may help protect it from corrosion.

Hardness If a resin-bed water softener is being used, the Calcium and Magnesium results should be low (less than 5 mg/L). If they're not, double-check all of the softener's settings and make sure the end of the suction line in the brine tank isn't clogged with salt sludge. A well-maintained resin bed should last about 20 years.

Salinity The saltiness or dissolved salt content of water. Groundwater, inland lakes, and rivers are typically less than 0.5 parts-per-thousand (ppt). Brackish water is 0.5 to 30 ppt. Seawater and brines are 30 to 50 ppt.

Sulfur Usually found in drinking water and is most often directly attributable to the sulfate ion (SO₄).

Silica A small amount of silica is dissolved in drinking water from contact with soil.

Total Organic Carbon TOC does not identify specific organic contaminants. It will, however, detect the presence of all carbon-bearing molecules, thus identifying the presence of any organic contaminants, regardless of molecular make-up. A general water quality criteria for TOC is 2 mg/L for treated water and 4 mg/L for source water. TOC levels in chlorinated water influence the amount of Total Trihalomethanes (TTHMs) that are formed in that water.

Chloroform, Bromoform, Bromodichloromethane, Dibromochloromethane The maximum allowable concentration of the sum of these is 100 ug/L. These compounds are collectively called Total Trihalomethanes (TTHM) and are commonly found in municipal water supplies. Trihalomethanes are formed when chlorine is used to disinfect water for drinking and represent a group of chemicals called disinfection byproducts. They are a

byproduct of the reaction of chlorine or bromine with organic matter present in the water being treated. A good charcoal filter is effective at removing trihalomethanes from water, just be sure to change the charcoal bed frequently to avoid bacteria and mold buildup.

Ethylene dibromide EDB is very rarely found in drinking water. We can report it down to 0.2 ug/L. The extremely low EPA MCL 0.05 ug/L detection limit is beyond the scope of our value-centric kits. We are however EPA certified to analyze EDB using EPA Method 504 at additional cost. Please give us a call if you have reason to believe this is a concern in your situation.

PCBs Polychlorinated biphenyls are very rarely found in drinking water. We can report it down to 2 ug/L. The extremely low EPA MCL 0.5 ug/L detection limit is beyond the scope of our value-centric kits. We are however EPA certified to analyze PCB using EPA Method 508 at additional cost. Please give us a call if you have reason to believe this is a concern in your situation.

VOG TICs Volatile Organic Tentatively Identified Compounds - in a GC-MS volatile analysis using EPA method 524.2, we directly calibrate the instrument using a 5-point calibration curve using pure and authentic analytical standards. These are called "target analytes". But we can also have the ability to detect other contaminants during the course of the test, and will report up to 60 of these "Tentatively Identified Compounds" that we may find. We use the NIST mass spectral database of about 250,000 compounds to identify the contaminant, then do a "raw" quantification. It's called raw because we did not directly calibrate the instrument with that authentic compound, but we have a pretty good idea what response it will provide. So statistically, we report the TICs to only one significant figure, whereas we use two significant figures elsewhere for organics.

SVOC TICs Semi-Volatile Organic Tentatively Identified Compounds - In a GC-MS semi-volatile analysis using EPA Method 525.2, we directly calibrate the instrument using a 5-point calibration curve using pure and authentic analytical standards. These are called "target analytes". But we also have the ability to detect other contaminants during the course of the test, and will report up to 60 of these "Tentatively Identified Compounds" that we may find. We use the NIST mass spectral database of about 250,000 compounds to identify the contaminant, then do a "raw" quantification. It's called raw because we did not directly calibrate the instrument with that authentic compound, but we have a pretty good idea what response it will provide. So statistically, we report the TICs to only one significant figure, whereas we use two significant figures elsewhere for organics.