

**Microbac**

KNOXVILLE DIVISION  
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STATE CERT ID.  
 TN 02017

CHEMISTRY · MICROBIOLOGY · FOOD SAFETY · CONSUMER PRODUCTS  
 WATER · AIR · WASTES · FOOD · PHARMACEUTICALS · NUTRACEUTICALS

**CERTIFICATE OF ANALYSIS**  
**PRELIMINARY REPORT**

CITY OF KINGSTON  
 CHUCK MOORE  
 125 W. CUMBERLAND ST.  
 KINGSTON, TN 37763

Date Reported  
 Date Received 12/20/2009  
 Cust P.O.  
 Invoice No.  
 Cust # C120  
 Sample Date 12/20/2009  
 Permit No. 0000360

Work Order Number: 0912-00937

Subject: KINGSTON WTP RAW AND FINISHED WATER SAMPLES

Test	Method	Result	Qual	Date	Time	Tech
<b>001 RAW 12/20/09 0630</b>						
[ TAL METALS ]					00:00	SRR
ALUMINUM	EPA 200.7	0.395 MG/L		12/22/2009	13:26	SRR
ANTIMONY	EPA 200.7	<0.0020 MG/L	M	12/22/2009	13:26	SRR
ARSENIC	EPA 200.7	<0.0010 MG/L	M	12/22/2009	13:26	SRR
BARIUM	EPA 200.7	0.0231 MG/L		12/22/2009	13:26	SRR
BERYLLIUM	EPA 200.7	<0.0010 MG/L		12/22/2009	13:26	SRR
CADMIUM	EPA 200.7	<0.0010 MG/L		12/22/2009	13:26	SRR
CHROMIUM	EPA 200.7	<0.0010 MG/L		12/22/2009	13:26	SRR
COBALT	EPA 200.7	<0.0010 MG/L		12/22/2009	13:26	SRR
COPPER	EPA 200.7	0.0014 MG/L		12/22/2009	13:26	SRR
IRON	EPA 200.7	0.436 MG/L		12/22/2009	13:26	SRR
LEAD	EPA 200.7	<0.0010 MG/L	M	12/22/2009	13:26	SRR
MAGNESIUM	EPA 200.7	4.54 MG/L		12/21/2009	15:50	SRR
MANGANESE	EPA 200.7	0.0443 MG/L		12/22/2009	13:26	SRR
MOLYBDENUM	EPA 200.7	<0.0010 MG/L		12/22/2009	13:26	SRR
MERCURY	EPA 245.1	<0.0002 MG/L		12/21/2009	15:08	SRR
NICKEL	EPA 200.7	<0.0010 MG/L		12/22/2009	13:26	SRR
SELENIUM	EPA 200.7	<0.0020 MG/L	J-,M	12/22/2009	13:26	SRR
SILVER	EPA 200.7	<0.0010 MG/L		12/22/2009	13:26	SRR
TIN	EPA 200.7	<0.0010 MG/L		12/22/2009	13:26	SRR
TITANIUM	EPA 200.7	0.0091 MG/L		12/22/2009	13:26	SRR
THALLIUM	EPA 200.7	<0.0020 MG/L	M	12/22/2009	13:26	SRR
ZINC	EPA 200.7	0.0216 MG/L		12/22/2009	13:26	SRR
BORON	EPA 200.7	0.0047 MG/L		12/22/2009	13:26	SRR
SOLIDS, TOTAL SUSPENDED	SM 2540,D.	8.98 MG/L		12/21/2009	10:00	KDW
HARDNESS, TOTAL AS CaCO3	EPA 200.7;2340,B.	74.6 MG/L		12/21/2009	15:50	SRR

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**002 RAW 12/20/09 0630 DISSOLVED METALS**

Test	Method	Result	Qual	Date	Time	Tech
[ TAL METALS ]					00:00	
ALUMINUM	EPA 200.7	0.0147 MG/L	J-	12/22/2009	13:43	SRR
ANTIMONY	EPA 200.7	<0.0020 MG/L	M	12/22/2009	13:43	SRR
ARSENIC	EPA 200.7	<0.0010 MG/L	M	12/22/2009	13:43	SRR
BARIUM	EPA 200.7	0.0198 MG/L		12/22/2009	13:43	SRR
BERYLLIUM	EPA 200.7	<0.0010 MG/L		12/22/2009	13:43	SRR
CADMIUM	EPA 200.7	<0.0010 MG/L		12/22/2009	13:43	SRR
CHROMIUM	EPA 200.7	<0.0010 MG/L		12/22/2009	13:43	SRR
COBALT	EPA 200.7	<0.0010 MG/L		12/22/2009	13:43	SRR
COPPER	EPA 200.7	<0.0010 MG/L		12/22/2009	13:43	SRR
IRON	EPA 200.7	0.0353 MG/L		12/22/2009	13:43	SRR
LEAD	EPA 200.7	<0.0010 MG/L	M	12/22/2009	13:43	SRR
MAGNESIUM	EPA 200.7	4.36 MG/L	*	12/21/2009	16:55	SRR
MANGANESE	EPA 200.7	<0.0050 MG/L		12/22/2009	13:43	SRR
MOLYBDENUM	EPA 200.7	<0.0010 MG/L		12/22/2009	13:43	SRR
MERCURY	EPA 245.1	<0.0002 MG/L		12/21/2009	15:33	SRR
NICKEL	EPA 200.7	<0.0010 MG/L		12/22/2009	13:43	SRR
SELENIUM	EPA 200.7	<0.0020 MG/L	J-,M	12/22/2009	13:43	SRR
SILVER	EPA 200.7	<0.0010 MG/L		12/22/2009	13:43	SRR
TIN	EPA 200.7	<0.0010 MG/L		12/22/2009	13:43	SRR
TITANIUM	EPA 200.7	<0.0010 MG/L		12/22/2009	13:43	SRR
THALLIUM	EPA 200.7	<0.0020 MG/L	M	12/22/2009	13:43	SRR
ZINC	EPA 200.7	0.0155 MG/L		12/22/2009	13:43	SRR
BORON	EPA 200.7	0.0043 MG/L		12/22/2009	13:43	SRR
SILICA (SiO2)	EPA 200.7	5.46 MG/L		12/21/2009	16:55	SRR

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Test	Method	Result	Qual	Date	Time	Tech
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003 **FINISHED 12/20/09 0630**

[ TAL METALS ]

					00:00	
ALUMINUM	EPA 200.7	0.0228 MG/L		12/22/2009	13:34	SRR
ANTIMONY	EPA 200.7	<0.0020 MG/L	M	12/22/2009	13:34	SRR
ARSENIC	EPA 200.7	<0.0010 MG/L	M	12/22/2009	13:34	SRR
BARIUM	EPA 200.7	0.0191 MG/L		12/22/2009	13:34	SRR
BERYLLIUM	EPA 200.7	<0.0010 MG/L		12/22/2009	13:34	SRR
CADMIUM	EPA 200.7	<0.0010 MG/L		12/22/2009	13:34	SRR
CHROMIUM	EPA 200.7	<0.0010 MG/L		12/22/2009	13:34	SRR
COBALT	EPA 200.7	<0.0010 MG/L		12/22/2009	13:34	SRR
COPPER	EPA 200.7	0.0019 MG/L		12/22/2009	13:34	SRR
IRON	EPA 200.7	0.0073 MG/L		12/22/2009	13:34	SRR
LEAD	EPA 200.7	<0.0010 MG/L	M	12/22/2009	13:34	SRR
MAGNESIUM	EPA 200.7	4.29 MG/L	*	12/21/2009	16:47	SRR
MANGANESE	EPA 200.7	<0.0050 MG/L		12/22/2009	13:34	SRR
MOLYBDENUM	EPA 200.7	<0.0010 MG/L		12/22/2009	13:34	SRR
MERCURY	EPA 245.1	<0.0002 MG/L		12/21/2009	15:29	SRR
NICKEL	EPA 200.7	<0.0010 MG/L		12/22/2009	13:34	SRR
SELENIUM	EPA 200.7	<0.0020 MG/L	J-,M	12/22/2009	13:34	SRR
SILVER	EPA 200.7	0.0025 MG/L		12/22/2009	13:34	SRR
TIN	EPA 200.7	<0.0010 MG/L		12/22/2009	13:34	SRR
TITANIUM	EPA 200.7	<0.0010 MG/L		12/22/2009	13:34	SRR
THALLIUM	EPA 200.7	<0.0020 MG/L	M	12/22/2009	13:34	SRR
ZINC	EPA 200.7	0.0046 MG/L		12/22/2009	13:34	SRR
BORON	EPA 200.7	0.0044 MG/L		12/22/2009	13:34	SRR
SOLIDS, TOTAL SUSPENDED	SM 2540,D.	<4.00 MG/L		12/21/2009	10:00	KDW

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Test	Method	Result	Qual	Date	Time	Tech
<b>003 FINISHED 12/20/09 0630</b>						
.....continued						
HARDNESS, TOTAL AS CaCO3	EPA 200.7;2340,B.	74.6 MG/L	J-,*	12/21/2009	16:47	SRR
<b>004 FINISHED 12/20/09 0630 DISSOLVED METALS</b>						
[ TAL METALS ]					00:00	
ALUMINUM	EPA 200.7	0.0070 MG/L	J-	12/22/2009	13:51	SRR
ANTIMONY	EPA 200.7	<0.0020 MG/L	M	12/22/2009	13:51	SRR
ARSENIC	EPA 200.7	<0.0010 MG/L	M	12/22/2009	13:51	SRR
BARIUM	EPA 200.7	0.0185 MG/L		12/22/2009	13:51	SRR
BERYLLIUM	EPA 200.7	<0.0010 MG/L		12/22/2009	13:51	SRR
CADMIUM	EPA 200.7	<0.0010 MG/L		12/22/2009	13:51	SRR
CHROMIUM	EPA 200.7	<0.0010 MG/L		12/22/2009	13:51	SRR
COBALT	EPA 200.7	<0.0010 MG/L		12/22/2009	13:51	SRR
COPPER	EPA 200.7	0.0017 MG/L		12/22/2009	13:51	SRR
IRON	EPA 200.7	<0.0060 MG/L		12/22/2009	13:51	SRR
LEAD	EPA 200.7	<0.0010 MG/L	M	12/22/2009	13:51	SRR
MAGNESIUM	EPA 200.7	4.21 MG/L	*	12/21/2009	17:04	SRR
MANGANESE	EPA 200.7	<0.0050 MG/L		12/22/2009	13:51	SRR
MOLYBDENUM	EPA 200.7	<0.0010 MG/L		12/22/2009	13:51	SRR
MERCURY	EPA 245.1	<0.0002 MG/L		12/21/2009	15:37	SRR
NICKEL	EPA 200.7	<0.0010 MG/L		12/22/2009	13:51	SRR
SELENIUM	EPA 200.7	<0.0020 MG/L	J-,M	12/22/2009	13:51	SRR
SILVER	EPA 200.7	0.0011 MG/L		12/22/2009	13:51	SRR
TIN	EPA 200.7	<0.0010 MG/L		12/22/2009	13:51	SRR
TITANIUM	EPA 200.7	<0.0010 MG/L		12/22/2009	13:51	SRR

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004 **FINISHED 12/20/09 0630 DISSOLVED METALS**  
 .....continued

THALLIUM	EPA 200.7	<0.0020 MG/L	M	12/22/2009	13:51	SRR
ZINC	EPA 200.7	0.0044 MG/L		12/22/2009	13:51	SRR
BORON	EPA 200.7	0.0042 MG/L		12/22/2009	13:51	SRR
SILICA (SiO2)	EPA 200.7	5.69 MG/L		12/21/2009	17:04	SRR

**M= THESE SAMPLES ARE REPORTED BY METHOD 200.7 FOR INFORMATIONAL PURPOSES TO PROVIDE QUICKER REPORTING. WHILE THESE REPORTED NUMBERS ARE CONSIDERED ACCURATE, TDEC APPROVED METHODS (EITHER 200.8 OR 200.9) ARE ALSO BEING ANALYZED AS VERIFICATION AND THIS REPORT WILL BE MODIFIED TO REFLECT THE METHOD CHANGE WHEN COMPLETE.**

RESPECTFULLY SUBMITTED: \_\_\_\_\_

MICROBAC LABORATORIES, INC.

*Thank you for your business. We invite your feedback on our level of service to you. Please contact the Laboratory Director, James Nokes, at 865-977-1200, the COO, Robert Morgan, at rmorgan@microbac.com or the President, James Nokes, at jnokes@microbac.com with any comments or suggestions.*



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As regulatory limits change frequently, Microbac advises the recipient of this report to confirm such limits with the appropriate Federal, state, or local authorities before acting in reliance on the regulatory limits provided.

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**QUALIFIER DEFINITIONS:**

- B = Detected in the associated Method Blank
- C = As Tons CaCO<sub>3</sub>, equivalent per 1,000 tons material
- D = Surrogate recoveries not calculated due to matrix interference and resulting sample dilution
- E1 = Elevated detection limits due to sample matrix interference
- E2 = Elevated detection limits due to high analyte concentration
- H = Analyte was prepared and/or analyzed outside of the analytical method holding time
- I = Spike recovery outside control limits due to sample matrix interference or high analyte concentration
- J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample
- J+ = The result is an estimated quantity, but the result may be biased high
- J- = The result is an estimated quantity, but the result may be biased low
- UJ = The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise
- K = Analyte concentration estimated due to sample matrix interference and/or high analyte concentration interference
- L1 = Liquid portion of dual phase sample analyzed only
- L2 = Solid portion of dual phase sample analyzed only
- M = Miscellaneous (see entry below analytical results)
- N = Analyte acceptable but matrix spike/matrix spike duplicate outside accepted recovery criteria
- \* = Matrix Spike/Matrix Spike Duplicate RPD is outside acceptable limits
- P = Sample received improperly preserved
- R = Relative Percent Duplicate (RPD) outside accepted recovery limits
- S1 = Spike recovery outside recovery limits
- S2 = Surrogate recovery outside of control limits. The data was accepted based on the valid recovery of remaining surrogate.
- U = Undetected
- V = Elevated reporting limits due to insufficient sample volume
- W = Results reports on dry weight basis
- Z - The parameter is considered a field analysis with an immediate to 15 minute holding time. Laboratory analysis is confirmatory in nature and is performed outside the preferred holding time window.

**ABBREVIATIONS:**

TNTC = Too Numerous To Count  
 UG/L = Micrograms per Liter (PPB)  
 MG/KG = Milligrams per Kilogram (PPM)  
 CFU = Colony Forming Unit



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