

**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 5/26/2009  
 Cust P.O.  
 Invoice No.  
 Cust # C120  
 Sample Date 5/26/2009  
 Permit No.

Work Order Number: 0905-01004

Subject: KINGSTON WTP RAW AND FINISHED WATER SAMPLES

Test	Method	Result	Qual	Date	Time	Tech
<b>001 RAW 5/26/09 0630</b>						
[ TAL METALS ]						
ALUMINUM	EPA 200.7	0.143 MG/L	N,*	05/28/2009	14:37	JKD
ANTIMONY	EPA 200.7	<0.0020 MG/L	M	05/28/2009	14:37	JKD
ARSENIC	EPA 200.7	<0.0010 MG/L	M	05/28/2009	14:37	JKD
BARIUM	EPA 200.7	0.0193 MG/L		05/28/2009	14:37	JKD
BERYLLIUM	EPA 200.7	<0.0010 MG/L		05/28/2009	14:37	JKD
CADMIUM	EPA 200.7	<0.0010 MG/L		05/28/2009	14:37	JKD
CHROMIUM	EPA 200.7	<0.0010 MG/L		05/28/2009	14:37	JKD
COBALT	EPA 200.7	<0.0010 MG/L		05/28/2009	14:37	JKD
COPPER	EPA 200.7	0.0040 MG/L		05/28/2009	14:37	JKD
IRON	EPA 200.7	0.118 MG/L		05/28/2009	14:37	JKD
LEAD	EPA 200.7	<0.0010 MG/L	M	05/28/2009	14:37	JKD
MAGNESIUM	EPA 200.7	4.39 MG/L	E	05/27/2009	14:52	JKD
MANGANESE	EPA 200.7	0.0215 MG/L	N,*	05/28/2009	14:37	JKD
MOLYBDENUM	EPA 200.7	<0.0010 MG/L		05/28/2009	14:37	JKD
MERCURY	EPA 245.1	<0.0002 MG/L		05/26/2009	16:28	MAR
NICKEL	EPA 200.7	<0.0010 MG/L		05/28/2009	14:37	JKD
SELENIUM	EPA 200.7	<0.0020 MG/L	M	05/28/2009	14:37	JKD
SILVER	EPA 200.7	<0.0010 MG/L		05/28/2009	14:37	JKD
TIN	EPA 200.7	<0.0010 MG/L		05/28/2009	14:37	JKD
TITANIUM	EPA 200.7	0.0033 MG/L		05/28/2009	14:37	JKD
THALLIUM	EPA 200.7	<0.0020 MG/L	M	05/28/2009	14:37	JKD
ZINC	EPA 200.7	0.0107 MG/L		05/28/2009	14:37	JKD
BORON	EPA 200.7	0.0101 MG/L		05/28/2009	14:37	JKD
SOLIDS, TOTAL SUSPENDED	SM 2540,D.	4.80 MG/L		05/26/2009	13:45	KDW
HARDNESS, TOTAL AS CaCO3	EPA 200.7;2340,B.	67.4 MG/L		05/27/2009	14:52	JKD



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**002 RAW 5/26/09 0630 DISSOLVED METALS**

Test	Method	Result	Qual	Date	Time	Tech
[ TAL METALS ]					00:00	
ALUMINUM	EPA 200.7	<0.0050 MG/L	N,*	05/28/2009	14:43	JKD
ANTIMONY	EPA 200.7	<0.0020 MG/L	M	05/28/2009	14:43	JKD
ARSENIC	EPA 200.7	<0.0010 MG/L	M	05/28/2009	14:43	JKD
BARIUM	EPA 200.7	0.0176 MG/L		05/28/2009	14:43	JKD
BERYLLIUM	EPA 200.7	<0.0010 MG/L		05/28/2009	14:43	JKD
CADMIUM	EPA 200.7	<0.0010 MG/L		05/28/2009	14:43	JKD
CHROMIUM	EPA 200.7	<0.0010 MG/L		05/28/2009	14:43	JKD
COBALT	EPA 200.7	<0.0010 MG/L		05/28/2009	14:43	JKD
COPPER	EPA 200.7	0.0022 MG/L		05/28/2009	14:43	JKD
IRON	EPA 200.7	<0.0060 MG/L		05/28/2009	14:43	JKD
LEAD	EPA 200.7	<0.0010 MG/L	M	05/28/2009	14:43	JKD
MAGNESIUM	EPA 200.7	4.43 MG/L	E	05/27/2009	14:58	JKD
MANGANESE	EPA 200.7	<0.0050 MG/L	N,*	05/28/2009	14:43	JKD
MOLYBDENUM	EPA 200.7	<0.0010 MG/L		05/28/2009	14:43	JKD
MERCURY	EPA 245.1	<0.0002 MG/L		05/26/2009	16:47	MAR
NICKEL	EPA 200.7	<0.0010 MG/L		05/28/2009	14:43	JKD
SELENIUM	EPA 200.7	<0.0020 MG/L	M	05/28/2009	14:43	JKD
SILVER	EPA 200.7	<0.0010 MG/L		05/28/2009	14:43	JKD
TIN	EPA 200.7	<0.0010 MG/L		05/28/2009	14:43	JKD
TITANIUM	EPA 200.7	<0.0010 MG/L		05/28/2009	14:43	JKD
THALLIUM	EPA 200.7	<0.0020 MG/L	M	05/28/2009	14:43	JKD
ZINC	EPA 200.7	0.0069 MG/L		05/28/2009	14:43	JKD
BORON	EPA 200.7	0.0096 MG/L		05/28/2009	14:43	JKD
SILICA (SiO2)	EPA 200.7	3.41 MG/L		05/27/2009	14:58	JKD



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Test	Method	Result	Qual	Date	Time	Tech
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003 **FINISHED 5/26/09 0630**

[ TAL METALS ]

Test	Method	Result	Qual	Date	Time	Tech
ALUMINUM	EPA 200.7	0.0179 MG/L	N,*	05/28/2009	14:50	JKD
ANTIMONY	EPA 200.7	<0.0020 MG/L	M	05/28/2009	14:50	JKD
ARSENIC	EPA 200.7	<0.0010 MG/L	M	05/28/2009	14:50	JKD
BARIUM	EPA 200.7	0.0159 MG/L		05/28/2009	14:50	JKD
BERYLLIUM	EPA 200.7	<0.0010 MG/L		05/28/2009	14:50	JKD
CADMIUM	EPA 200.7	<0.0010 MG/L		05/28/2009	14:50	JKD
CHROMIUM	EPA 200.7	<0.0010 MG/L		05/28/2009	14:50	JKD
COBALT	EPA 200.7	<0.0010 MG/L		05/28/2009	14:50	JKD
COPPER	EPA 200.7	0.0034 MG/L		05/28/2009	14:50	JKD
IRON	EPA 200.7	<0.0060 MG/L		05/28/2009	14:50	JKD
LEAD	EPA 200.7	<0.0010 MG/L	M	05/28/2009	14:50	JKD
MAGNESIUM	EPA 200.7	4.26 MG/L	E	05/27/2009	15:04	JKD
MANGANESE	EPA 200.7	<0.0050 MG/L	N,*	05/28/2009	14:50	JKD
MOLYBDENUM	EPA 200.7	<0.0010 MG/L		05/28/2009	14:50	JKD
MERCURY	EPA 245.1	<0.0002 MG/L		05/26/2009	16:50	MAR
NICKEL	EPA 200.7	<0.0010 MG/L		05/28/2009	14:50	JKD
SELENIUM	EPA 200.7	<0.0020 MG/L	M	05/28/2009	14:50	JKD
SILVER	EPA 200.7	<0.0010 MG/L		05/28/2009	14:50	JKD
TIN	EPA 200.7	<0.0010 MG/L		05/28/2009	14:50	JKD
TITANIUM	EPA 200.7	<0.0010 MG/L		05/28/2009	14:50	JKD
THALLIUM	EPA 200.7	<0.0020 MG/L	M	05/28/2009	14:50	JKD
ZINC	EPA 200.7	0.0042 MG/L		05/28/2009	14:50	JKD
BORON	EPA 200.7	0.0076 MG/L		05/28/2009	14:50	JKD
SOLIDS, TOTAL SUSPENDED	SM 2540,D.	<4.00 MG/L		05/26/2009	13:45	KDW

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Test	Method	Result	Qual	Date	Time	Tech
<b>003 FINISHED 5/26/09 0630</b>						
.....continued						
HARDNESS, TOTAL AS CaCO3	EPA 200.7;2340,B.	65.4 MG/L		05/27/2009	15:04	JKD
<b>004 FINISHED 5/26/09 0630 DISSOLVED METALS</b>						
[ TAL METALS ]					00:00	
ALUMINUM	EPA 200.7	0.0306 MG/L	N,*	05/28/2009	14:57	JKD
ANTIMONY	EPA 200.7	<0.0020 MG/L	M	05/28/2009	14:57	JKD
ARSENIC	EPA 200.7	<0.0010 MG/L	M	05/28/2009	14:57	JKD
BARIUM	EPA 200.7	0.0178 MG/L		05/28/2009	14:57	JKD
BERYLLIUM	EPA 200.7	<0.0010 MG/L		05/28/2009	14:57	JKD
CADMIUM	EPA 200.7	<0.0010 MG/L		05/28/2009	14:57	JKD
CHROMIUM	EPA 200.7	<0.0010 MG/L		05/28/2009	14:57	JKD
COBALT	EPA 200.7	<0.0010 MG/L		05/28/2009	14:57	JKD
COPPER	EPA 200.7	0.0047 MG/L		05/28/2009	14:57	JKD
IRON	EPA 200.7	<0.0060 MG/L		05/28/2009	14:57	JKD
LEAD	EPA 200.7	<0.0010 MG/L	M	05/28/2009	14:57	JKD
MAGNESIUM	EPA 200.7	4.52 MG/L	E	05/27/2009	15:47	JKD
MANGANESE	EPA 200.7	<0.0050 MG/L	N,*	05/28/2009	14:57	JKD
MOLYBDENUM	EPA 200.7	<0.0010 MG/L		05/28/2009	14:57	JKD
MERCURY	EPA 245.1	<0.0002 MG/L		05/26/2009	16:53	MAR
NICKEL	EPA 200.7	<0.0010 MG/L		05/28/2009	14:57	JKD
SELENIUM	EPA 200.7	<0.0020 MG/L	M	05/28/2009	14:57	JKD
SILVER	EPA 200.7	<0.0010 MG/L		05/28/2009	14:57	JKD
TIN	EPA 200.7	<0.0010 MG/L		05/28/2009	14:57	JKD
TITANIUM	EPA 200.7	<0.0010 MG/L		05/28/2009	14:57	JKD

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004 **FINISHED 5/26/09 0630 DISSOLVED METALS**

.....continued

THALLIUM	EPA 200.7	<0.0020 MG/L	M	05/28/2009	14:57	JKD
ZINC	EPA 200.7	0.0068 MG/L		05/28/2009	14:57	JKD
BORON	EPA 200.7	0.0089 MG/L		05/28/2009	14:57	JKD
SILICA (SiO2)	EPA 200.7	4.10 MG/L		05/27/2009	15:47	JKD

**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 CEO, Trevor Boyce, at tboyce@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

**ABBREVIATIONS:**

- TNTC = Too Numerous To Count
- UG/L = Micrograms per Liter (PPB)
- UG/KG = Micrograms per Kilogram (PPB)
- MG/L = Milligrams per Liter (PPM)
- MG/KG = Milligrams per Kilogram (PPM)
- CFU = Colony Forming Unit
- ND = Not Detected at or below the reporting limit
- TIC = Tentatively Identified Compound



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