

Microbac

KNOXVILLE DIVISION
 505 EAST BROADWAY AVE.
 MARYVILLE, TN 37804
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 http://www.microbac.com
 E-Mail: knoxville@microbac.com

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 2/18/2010
 Cust P.O.
 Invoice No.
 Cust # C120
 Sample Date 2/18/2010
 Permit No. 0000360

Work Order Number: 1002-00703

Subject: KINGSTON WTP RAW AND FINISHED WATER SAMPLES

| Test | Method | Result | Qual | Date | Time | Tech |
|--------------------------|-------------------------|--------------|----------|------------|-------|------|
| 001 | RAW 2/18/10 0630 | | | | | |
| [TAL METALS] | | | | | 00:00 | |
| ALUMINUM | EPA 200.7 | 0.201 MG/L | B | 02/22/2010 | 11:37 | SRR |
| ANTIMONY | EPA 200.7 | <0.0020 MG/L | | 02/22/2010 | 11:37 | SRR |
| ARSENIC | EPA 200.7 | <0.0010 MG/L | | 02/22/2010 | 11:37 | SRR |
| BARIUM | EPA 200.7 | 0.0284 MG/L | J+, N, B | 02/22/2010 | 11:37 | SRR |
| BERYLLIUM | EPA 200.7 | <0.0010 MG/L | | 02/22/2010 | 11:37 | SRR |
| CADMIUM | EPA 200.7 | <0.0010 MG/L | | 02/22/2010 | 11:37 | SRR |
| CHROMIUM | EPA 200.7 | <0.0010 MG/L | | 02/22/2010 | 11:37 | SRR |
| COBALT | EPA 200.7 | <0.0010 MG/L | | 02/22/2010 | 11:37 | SRR |
| COPPER | EPA 200.7 | 0.0013 MG/L | | 02/22/2010 | 11:37 | SRR |
| IRON | EPA 200.7 | 0.319 MG/L | | 02/22/2010 | 11:37 | SRR |
| LEAD | EPA 200.7 | <0.0010 MG/L | | 02/22/2010 | 11:37 | SRR |
| MAGNESIUM | EPA 200.7 | 4.68 MG/L | B | 02/22/2010 | 11:37 | SRR |
| MANGANESE | EPA 200.7 | 0.0263 MG/L | | 02/22/2010 | 11:37 | SRR |
| MOLYBDENUM | EPA 200.7 | 0.0064 MG/L | | 02/22/2010 | 11:37 | SRR |
| MERCURY | EPA 245.1 | <0.0002 MG/L | | 02/22/2010 | 13:39 | SRR |
| NICKEL | EPA 200.7 | <0.0010 MG/L | | 02/22/2010 | 11:37 | SRR |
| SELENIUM | EPA 200.7 | <0.0020 MG/L | | 02/22/2010 | 11:37 | SRR |
| SILVER | EPA 200.7 | <0.0010 MG/L | | 02/22/2010 | 11:37 | SRR |
| TIN | EPA 200.7 | <0.0010 MG/L | | 02/22/2010 | 11:37 | SRR |
| TITANIUM | EPA 200.7 | 0.0081 MG/L | | 02/22/2010 | 11:37 | SRR |
| THALLIUM | EPA 200.7 | <0.0020 MG/L | | 02/22/2010 | 11:37 | SRR |
| ZINC | EPA 200.7 | 0.0299 MG/L | N, B | 02/22/2010 | 11:37 | SRR |
| BORON | EPA 200.7 | 0.0070 MG/L | | 02/22/2010 | 11:37 | SRR |
| SOLIDS, TOTAL SUSPENDED | SM 2540.D. | 6.45 MG/L | | 02/22/2010 | 10:00 | KDW |
| HARDNESS, TOTAL AS CaCO3 | EPA 200.7;2340.B. | 60.6 MG/L | J+ | 02/22/2010 | 11:37 | SRR |



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|------|--------|--------|------|------|------|------|

002 **RAW 2/18/10 0630 DISSOLVED METALS**

| Test | Method | Result | Qual | Date | Time | Tech |
|----------------|-----------|--------------|-------|------------|-------|------|
| [TAL METALS] | | | | | 00:00 | |
| ALUMINUM | EPA 200.7 | 0.0319 MG/L | B | 02/22/2010 | 12:56 | SRR |
| ANTIMONY | EPA 200.7 | <0.0020 MG/L | | 02/22/2010 | 12:56 | SRR |
| ARSENIC | EPA 200.7 | <0.0010 MG/L | | 02/22/2010 | 12:56 | SRR |
| BARIUM | EPA 200.7 | 0.0293 MG/L | J+, B | 02/22/2010 | 12:56 | SRR |
| BERYLLIUM | EPA 200.7 | <0.0010 MG/L | | 02/22/2010 | 12:56 | SRR |
| CADMIUM | EPA 200.7 | <0.0010 MG/L | | 02/22/2010 | 12:56 | SRR |
| CHROMIUM | EPA 200.7 | <0.0010 MG/L | | 02/22/2010 | 12:56 | SRR |
| COBALT | EPA 200.7 | <0.0010 MG/L | | 02/22/2010 | 12:56 | SRR |
| COPPER | EPA 200.7 | <0.0010 MG/L | B | 02/22/2010 | 12:56 | SRR |
| IRON | EPA 200.7 | 0.0349 MG/L | | 02/22/2010 | 12:56 | SRR |
| LEAD | EPA 200.7 | <0.0010 MG/L | | 02/22/2010 | 12:56 | SRR |
| MAGNESIUM | EPA 200.7 | 2.94 MG/L | B | 02/22/2010 | 12:56 | SRR |
| MANGANESE | EPA 200.7 | 0.0063 MG/L | | 02/22/2010 | 12:56 | SRR |
| MOLYBDENUM | EPA 200.7 | <0.0010 MG/L | | 02/22/2010 | 12:56 | SRR |
| MERCURY | EPA 245.1 | <0.0002 MG/L | | 02/22/2010 | 13:48 | SRR |
| NICKEL | EPA 200.7 | <0.0010 MG/L | | 02/22/2010 | 12:56 | SRR |
| SELENIUM | EPA 200.7 | <0.0020 MG/L | | 02/22/2010 | 12:56 | SRR |
| SILVER | EPA 200.7 | <0.0010 MG/L | | 02/22/2010 | 12:56 | SRR |
| TIN | EPA 200.7 | <0.0010 MG/L | | 02/22/2010 | 12:56 | SRR |
| TITANIUM | EPA 200.7 | <0.0010 MG/L | | 02/22/2010 | 12:56 | SRR |
| THALLIUM | EPA 200.7 | <0.0020 MG/L | | 02/22/2010 | 12:56 | SRR |
| ZINC | EPA 200.7 | 0.0177 MG/L | B | 02/22/2010 | 12:56 | SRR |
| BORON | EPA 200.7 | 0.0070 MG/L | | 02/22/2010 | 12:56 | SRR |
| SILICA (SiO2) | EPA 200.7 | 5.54 MG/L | B | 02/22/2010 | 12:56 | SRR |



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|------|--------|--------|------|------|------|------|

003 **FINISHED 2/18/10 0630**

| Test | Method | Result | Qual | Date | Time | Tech |
|-------------------------|------------|--------------|----------|------------|-------|------|
| [TAL METALS] | | | | | 00:00 | |
| ALUMINUM | EPA 200.7 | 0.0242 MG/L | B | 02/22/2010 | 12:14 | SRR |
| ANTIMONY | EPA 200.7 | <0.0020 MG/L | | 02/22/2010 | 12:14 | SRR |
| ARSENIC | EPA 200.7 | <0.0010 MG/L | | 02/22/2010 | 12:14 | SRR |
| BARIUM | EPA 200.7 | 0.0254 MG/L | J+, N, B | 02/22/2010 | 12:14 | SRR |
| BERYLLIUM | EPA 200.7 | <0.0010 MG/L | | 02/22/2010 | 12:14 | SRR |
| CADMIUM | EPA 200.7 | <0.0010 MG/L | | 02/22/2010 | 12:14 | SRR |
| CHROMIUM | EPA 200.7 | <0.0010 MG/L | | 02/22/2010 | 12:14 | SRR |
| COBALT | EPA 200.7 | <0.0010 MG/L | | 02/22/2010 | 12:14 | SRR |
| COPPER | EPA 200.7 | 0.0021 MG/L | | 02/22/2010 | 12:14 | SRR |
| IRON | EPA 200.7 | <0.0060 MG/L | | 02/22/2010 | 12:14 | SRR |
| LEAD | EPA 200.7 | <0.0010 MG/L | | 02/22/2010 | 12:14 | SRR |
| MAGNESIUM | EPA 200.7 | 4.75 MG/L | B | 02/22/2010 | 12:14 | SRR |
| MANGANESE | EPA 200.7 | <0.0050 MG/L | | 02/22/2010 | 12:14 | SRR |
| MOLYBDENUM | EPA 200.7 | <0.0010 MG/L | | 02/22/2010 | 12:14 | SRR |
| MERCURY | EPA 245.1 | <0.0002 MG/L | | 02/22/2010 | 13:44 | SRR |
| NICKEL | EPA 200.7 | <0.0010 MG/L | | 02/22/2010 | 12:14 | SRR |
| SELENIUM | EPA 200.7 | <0.0020 MG/L | | 02/22/2010 | 12:14 | SRR |
| SILVER | EPA 200.7 | <0.0010 MG/L | | 02/22/2010 | 12:14 | SRR |
| TIN | EPA 200.7 | <0.0010 MG/L | | 02/22/2010 | 12:14 | SRR |
| TITANIUM | EPA 200.7 | <0.0010 MG/L | | 02/22/2010 | 12:14 | SRR |
| THALLIUM | EPA 200.7 | <0.0020 MG/L | | 02/22/2010 | 12:14 | SRR |
| ZINC | EPA 200.7 | 0.0106 MG/L | N, B | 02/22/2010 | 12:14 | SRR |
| BORON | EPA 200.7 | 0.0072 MG/L | | 02/22/2010 | 12:14 | SRR |
| SOLIDS, TOTAL SUSPENDED | SM 2540,D. | <4.00 MG/L | | 02/22/2010 | 10:00 | KDW |

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|---------------------------------------------------|-------------------|--------------|-------|------------|-------|------|
| 003 FINISHED 2/18/10 0630 | | | | | | |
|continued | | | | | | |
| HARDNESS, TOTAL AS CaCO3 | EPA 200.7;2340,B. | 61.5 MG/L | J+ | 02/22/2010 | 12:14 | SRR |
| 004 FINISHED 2/18/10 0630 DISSOLVED METALS | | | | | | |
| [TAL METALS] | | | | | 00:00 | |
| ALUMINUM | EPA 200.7 | 0.0188 MG/L | B | 02/22/2010 | 13:04 | SRR |
| ANTIMONY | EPA 200.7 | <0.0020 MG/L | | 02/22/2010 | 13:04 | SRR |
| ARSENIC | EPA 200.7 | <0.0010 MG/L | | 02/22/2010 | 13:04 | SRR |
| BARIUM | EPA 200.7 | 0.0263 MG/L | J+, B | 02/22/2010 | 13:04 | SRR |
| BERYLLIUM | EPA 200.7 | <0.0010 MG/L | | 02/22/2010 | 13:04 | SRR |
| CADMIUM | EPA 200.7 | <0.0010 MG/L | | 02/22/2010 | 13:04 | SRR |
| CHROMIUM | EPA 200.7 | <0.0010 MG/L | | 02/22/2010 | 13:04 | SRR |
| COBALT | EPA 200.7 | <0.0010 MG/L | | 02/22/2010 | 13:04 | SRR |
| COPPER | EPA 200.7 | 0.0021 MG/L | B | 02/22/2010 | 13:04 | SRR |
| IRON | EPA 200.7 | 0.0088 MG/L | | 02/22/2010 | 13:04 | SRR |
| LEAD | EPA 200.7 | <0.0010 MG/L | | 02/22/2010 | 13:04 | SRR |
| MAGNESIUM | EPA 200.7 | 2.91 MG/L | B | 02/22/2010 | 13:04 | SRR |
| MANGANESE | EPA 200.7 | <0.0050 MG/L | | 02/22/2010 | 13:04 | SRR |
| MOLYBDENUM | EPA 200.7 | <0.0010 MG/L | | 02/22/2010 | 13:04 | SRR |
| MERCURY | EPA 245.1 | <0.0002 MG/L | | 02/22/2010 | 13:52 | SRR |
| NICKEL | EPA 200.7 | <0.0010 MG/L | | 02/22/2010 | 13:04 | SRR |
| SELENIUM | EPA 200.7 | <0.0020 MG/L | | 02/22/2010 | 13:04 | SRR |
| SILVER | EPA 200.7 | <0.0010 MG/L | | 02/22/2010 | 13:04 | SRR |
| TIN | EPA 200.7 | <0.0010 MG/L | | 02/22/2010 | 13:04 | SRR |
| TITANIUM | EPA 200.7 | <0.0010 MG/L | | 02/22/2010 | 13:04 | SRR |

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|------|--------|--------|------|------|------|------|

004 **FINISHED 2/18/10 0630 DISSOLVED METALS**

.....continued

| | | | | | | |
|---------------|-----------|--------------|---|------------|-------|-----|
| THALLIUM | EPA 200.7 | <0.0020 MG/L | | 02/22/2010 | 13:04 | SRR |
| ZINC | EPA 200.7 | 0.0053 MG/L | B | 02/22/2010 | 13:04 | SRR |
| BORON | EPA 200.7 | 0.0073 MG/L | | 02/22/2010 | 13:04 | SRR |
| SILICA (SiO2) | EPA 200.7 | 5.85 MG/L | B | 02/22/2010 | 13:04 | 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 CaCO₃, 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
- MG/KG = Milligrams per Kilogram (PPM)
- UG/L = Micrograms per Liter (PPB)
- CFU = Colony Forming Unit



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