



Microbac Laboratories, Inc.  
 Knoxville Division  
 505 E. Broadway Avenue  
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**CERTIFICATE OF ANALYSIS**

Chuck Moore  
 City of Kingston  
 125 W. Cumberland St.  
 Kingston, TN 37763

Date Reported: 7/15/2010  
 Date Received: 7/6/2010  
 Cust #: RC120  
 PO#:

Workorder: 1004677 Project: Kingston WTP Raw and Finished Water Samples

Analyte	Result	Units	Qualifier	Reporting Limit	Analyst	Analyzed	Method
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Raw Sampled: 07/06/2010 06:30  
 1004677-01 (Water)

**Wet Chemistry**

Total Suspended Solids	ND	mg/L		4.0	KDW	07/06/2010 11:00	SM 2540.D.
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**Metals by EPA 200 Series Methods**

Aluminum	0.0932	mg/L	*, N	0.00500	SRR	07/08/2010 12:38	EPA 200.7
Barium	0.0354	mg/L		0.00200	SRR	07/08/2010 12:38	EPA 200.7
Beryllium	ND	mg/L		0.00100	SRR	07/08/2010 12:38	EPA 200.7
Boron	0.0248	mg/L	B	0.00100	SRR	07/08/2010 12:38	EPA 200.7
Cadmium	ND	mg/L		0.00100	SRR	07/08/2010 12:38	EPA 200.7
Chromium	ND	mg/L		0.00100	SRR	07/08/2010 12:38	EPA 200.7
Cobalt	ND	mg/L		0.00100	SRR	07/08/2010 12:38	EPA 200.7
Copper	0.00305	mg/L		0.00100	SRR	07/08/2010 12:38	EPA 200.7
Hardness, Total as CaCO3	90.8	mg/L		0.145	SRR	07/08/2010 13:01	EPA 200.7, SM 2340B
Iron	0.0748	mg/L	D	0.00600	SRR	07/08/2010 12:38	EPA 200.7
Magnesium	6.24	mg/L		0.00500	SRR	07/08/2010 12:38	EPA 200.7
Manganese	0.0289	mg/L		0.00500	SRR	07/08/2010 12:38	EPA 200.7
Mercury	0.00103	mg/L		0.000200	SRR	07/06/2010 19:07	EPA 245.1
Molybdenum	0.00116	mg/L		0.00100	SRR	07/08/2010 12:38	EPA 200.7
Nickel	ND	mg/L		0.00100	SRR	07/08/2010 12:38	EPA 200.7
Silver	ND	mg/L		0.00100	SRR	07/08/2010 12:38	EPA 200.7
Tin	ND	mg/L		0.00100	SRR	07/08/2010 12:38	EPA 200.7
Titanium	0.00211	mg/L		0.00100	SRR	07/08/2010 12:38	EPA 200.7
Zinc	0.00633	mg/L	B	0.00200	SRR	07/08/2010 12:38	EPA 200.7

**Metals by EPA 200 Series Methods**

Antimony	ND	mg/L	U	0.00500	AM	07/08/2010 14:59	EPA 200.8
Arsenic	ND	mg/L	U	0.00500	AM	07/08/2010 14:59	EPA 200.8
Lead	ND	mg/L	U	0.00500	AM	07/08/2010 14:59	EPA 200.8
Selenium	ND	mg/L	U	0.00500	AM	07/08/2010 14:59	EPA 200.8
Thallium	ND	mg/L	U	0.00100	AM	07/08/2010 14:59	EPA 200.8

Raw Dissolved Sampled: 07/06/2010 06:30  
 1004677-02 (Water)

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Workorder: 1004677 Project: Kingston WTP Raw and Finished Water Samples

Analyte	Result	Units	Qualifier	Reporting Limit	Analyst	Analyzed	Method
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**Raw Dissolved Sampled: 07/06/2010 06:30**  
**1004677-02 (Water)**

**Metals (Dissolved) by EPA 200 Series Methods**

Aluminum	ND	mg/L	B	0.00500	SRR	07/08/2010 13:44	EPA 200.7
<b>Barium</b>	<b>0.0337</b>	mg/L		0.00200	SRR	07/08/2010 13:44	EPA 200.7
Beryllium	ND	mg/L		0.00100	SRR	07/08/2010 13:44	EPA 200.7
<b>Boron</b>	<b>0.0215</b>	mg/L		0.00100	SRR	07/08/2010 13:44	EPA 200.7
Cadmium	ND	mg/L		0.00100	SRR	07/08/2010 13:44	EPA 200.7
Chromium	ND	mg/L		0.00100	SRR	07/08/2010 13:44	EPA 200.7
Cobalt	ND	mg/L		0.00100	SRR	07/08/2010 13:44	EPA 200.7
<b>Copper</b>	<b>0.00194</b>	mg/L		0.00100	SRR	07/08/2010 13:44	EPA 200.7
Iron	ND	mg/L		0.00600	SRR	07/08/2010 13:44	EPA 200.7
<b>Magnesium</b>	<b>6.02</b>	mg/L		0.00500	SRR	07/08/2010 13:44	EPA 200.7
Manganese	ND	mg/L		0.00500	SRR	07/08/2010 13:44	EPA 200.7
Mercury	ND	mg/L		0.000200	SRR	07/06/2010 17:19	EPA 245.1
<b>Molybdenum</b>	<b>0.00109</b>	mg/L		0.00100	SRR	07/08/2010 13:44	EPA 200.7
Nickel	ND	mg/L		0.00100	SRR	07/08/2010 13:44	EPA 200.7
<b>SILICA (SiO2)</b>	<b>3.63</b>	mg/L		0.0107	SRR	07/08/2010 13:44	EPA 200.7
Silver	ND	mg/L		0.00100	SRR	07/08/2010 13:44	EPA 200.7
Tin	ND	mg/L		0.00100	SRR	07/08/2010 13:44	EPA 200.7
Titanium	ND	mg/L		0.00100	SRR	07/08/2010 13:44	EPA 200.7
<b>Zinc</b>	<b>0.00600</b>	mg/L	B	0.00200	SRR	07/08/2010 13:44	EPA 200.7

**Metals (Dissolved) by EPA 200 Series Methods**

Antimony	ND	mg/L	U	0.00500	AM	07/08/2010 14:59	EPA 200.8
Arsenic	ND	mg/L	U	0.00500	AM	07/08/2010 14:59	EPA 200.8
Lead	ND	mg/L	U	0.00500	AM	07/08/2010 14:59	EPA 200.8
Selenium	ND	mg/L	U	0.00500	AM	07/08/2010 14:59	EPA 200.8
Thallium	ND	mg/L	U	0.00100	AM	07/08/2010 14:59	EPA 200.8

**Finished Sampled: 07/06/2010 06:30**  
**1004677-03 (Water)**

**Wet Chemistry**

Total Suspended Solids	ND	mg/L		4.0	KDW	07/06/2010 11:00	SM 2540.D.
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Finished Sampled: 07/06/2010 06:30  
 1004677-03 (Water)

**Metals by EPA 200 Series Methods**

Aluminum	0.0962	mg/L	*, N	0.00500	SRR	07/08/2010 13:08	EPA 200.7
Barium	0.0240	mg/L		0.00200	SRR	07/08/2010 13:08	EPA 200.7
Beryllium	ND	mg/L		0.00100	SRR	07/08/2010 13:08	EPA 200.7
Boron	0.0246	mg/L	B	0.00100	SRR	07/08/2010 13:08	EPA 200.7
Cadmium	ND	mg/L		0.00100	SRR	07/08/2010 13:08	EPA 200.7
Chromium	ND	mg/L		0.00100	SRR	07/08/2010 13:08	EPA 200.7
Cobalt	ND	mg/L		0.00100	SRR	07/08/2010 13:08	EPA 200.7
Copper	0.00355	mg/L		0.00100	SRR	07/08/2010 13:08	EPA 200.7
Hardness, Total as CaCO3	64.9	mg/L		0.0331	SRR	07/08/2010 13:08	EPA 200.7, SM 2340B
Iron	0.00828	mg/L	D	0.00600	SRR	07/08/2010 13:08	EPA 200.7
Magnesium	4.41	mg/L		0.00500	SRR	07/08/2010 13:08	EPA 200.7
Manganese	ND	mg/L		0.00500	SRR	07/08/2010 13:08	EPA 200.7
Mercury	ND	mg/L		0.000200	SRR	07/06/2010 19:12	EPA 245.1
Molybdenum	ND	mg/L		0.00100	SRR	07/08/2010 13:08	EPA 200.7
Nickel	ND	mg/L		0.00100	SRR	07/08/2010 13:08	EPA 200.7
Silver	ND	mg/L		0.00100	SRR	07/08/2010 13:08	EPA 200.7
Tin	ND	mg/L		0.00100	SRR	07/08/2010 13:08	EPA 200.7
Titanium	ND	mg/L		0.00100	SRR	07/08/2010 13:08	EPA 200.7
Zinc	0.00352	mg/L	B	0.00200	SRR	07/08/2010 13:08	EPA 200.7

**Metals by EPA 200 Series Methods**

Antimony	ND	mg/L	U	0.00500	AM	07/08/2010 14:59	EPA 200.8
Arsenic	ND	mg/L	U	0.00500	AM	07/08/2010 14:59	EPA 200.8
Lead	ND	mg/L	U	0.00500	AM	07/08/2010 14:59	EPA 200.8
Selenium	ND	mg/L	U	0.00500	AM	07/08/2010 14:59	EPA 200.8
Thallium	ND	mg/L	U	0.00100	AM	07/08/2010 14:59	EPA 200.8

Finished Dissolved Sampled: 07/06/2010 06:30  
 1004677-04 (Water)

**Metals (Dissolved) by EPA 200 Series Methods**

Aluminum	0.0769	mg/L	B	0.00500	SRR	07/08/2010 13:50	EPA 200.7
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Workorder: 1004677 Project: Kingston WTP Raw and Finished Water Samples

Analyte	Result	Units	Qualifier	Reporting Limit	Analyst	Analyzed	Method
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Finished Dissolved Sampled: 07/06/2010 06:30  
 1004677-04 (Water)

**Metals (Dissolved) by EPA 200 Series Methods**

Barium	0.0222	mg/L		0.00200	SRR	07/08/2010 13:50	EPA 200.7
Beryllium	ND	mg/L		0.00100	SRR	07/08/2010 13:50	EPA 200.7
Boron	0.0129	mg/L		0.00100	SRR	07/08/2010 13:50	EPA 200.7
Cadmium	ND	mg/L		0.00100	SRR	07/08/2010 13:50	EPA 200.7
Chromium	ND	mg/L		0.00100	SRR	07/08/2010 13:50	EPA 200.7
Cobalt	ND	mg/L		0.00100	SRR	07/08/2010 13:50	EPA 200.7
Copper	0.00294	mg/L		0.00100	SRR	07/08/2010 13:50	EPA 200.7
Iron	ND	mg/L		0.00600	SRR	07/08/2010 13:50	EPA 200.7
Magnesium	4.07	mg/L		0.00500	SRR	07/08/2010 13:50	EPA 200.7
Manganese	ND	mg/L		0.00500	SRR	07/08/2010 13:50	EPA 200.7
Mercury	ND	mg/L		0.000200	SRR	07/06/2010 17:23	EPA 245.1
Molybdenum	ND	mg/L		0.00100	SRR	07/08/2010 13:50	EPA 200.7
Nickel	ND	mg/L		0.00100	SRR	07/08/2010 13:50	EPA 200.7
SILICA (SiO2)	3.93	mg/L		0.0107	SRR	07/08/2010 13:50	EPA 200.7
Silver	ND	mg/L		0.00100	SRR	07/08/2010 13:50	EPA 200.7
Tin	ND	mg/L		0.00100	SRR	07/08/2010 13:50	EPA 200.7
Titanium	ND	mg/L		0.00100	SRR	07/08/2010 13:50	EPA 200.7
Zinc	0.00410	mg/L	B	0.00200	SRR	07/08/2010 13:50	EPA 200.7

**Metals (Dissolved) by EPA 200 Series Methods**

Antimony	ND	mg/L	U	0.00500	AM	07/08/2010 14:59	EPA 200.8
Arsenic	ND	mg/L	U	0.00500	AM	07/08/2010 14:59	EPA 200.8
Lead	ND	mg/L	U	0.00500	AM	07/08/2010 14:59	EPA 200.8
Selenium	ND	mg/L	U	0.00500	AM	07/08/2010 14:59	EPA 200.8
Thallium	ND	mg/L	U	0.00100	AM	07/08/2010 14:59	EPA 200.8

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Analyte	Result	Units	Qualifier	Reporting Limit	Analyst	Analyzed	Method
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**Certifications**

Code	Description	Number	Expires
EPA	Environmental Protection Agency	TN00020	
IN_DW	Indiana State Department of Health	C-TN-03	04/30/2011
KY_DW	Commonwealth of Kentucky	90067	12/31/2010
NELAP	Florida Department of Health	E87978	06/30/2010
PA	Commonwealth of Pennsylvania	68-00725 (003)	03/31/2011
TN_DW	State of Tennessee	TN02003	03/12/2011
TN_DW	State of Tennessee	TN02017	04/30/2011
USDA	US Department of Agriculture		11/30/2010
VA_DW	Commonwealth of Virginia	00335	06/30/2010
WV_DW	West Virginia Department of Health and Human Resou	9956 C	12/31/2010

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**Workorder:** 1004677      **Project:** Kingston WTP Raw and Finished Water Samples

Analyte	Result	Units	Qualifier	Reporting Limit	Analyst	Analyzed	Method
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**Notes and Definitions**

- U Indicates that the compound was analyzed for but not detected
- N Analyte acceptable but matrix spike/matrix spike duplicate outside accepted recovery criteria
- 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
- E Concentration exceeds calibration range
- D Surrogate recoveries not calculated due to matrix interference and resulting sample dilution
- B Detected in the associated Method Blank
- \* Relative Percent Duplicate (RPD) outside accepted recovery limits.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference

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Analyte	Result	Units	Qualifier	Reporting Limit	Analyst	Analyzed	Method
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Microbac Knoxville

JOE SLOAN For BROCK STONER, PROJECT MANAGER

*Thank you for your business. We invite your feedback on our level of service to you. Please contact the Laboratory Director, Ashley Morris, 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.*

*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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Cooler Inspection Form

Client Name: Kingston Water

Date/Time Received: 7/10/10 7:58

Work Order: 1004077

No. of Samples: 2

Received By: ALB

Checklist Completed By: ALB

Carrier: FedEx() UPS() Client() Field Services() Other():

- After-Hours Receipt? Yes  No
- Shipping container in good condition? Yes  No  Not Present
- Custody seals intact on cooler? Yes  No  Not Present
- Custody seals intact on samples? Yes  No  Not Present
- Chain of custody present? Yes  No  Not Present
- Chain of custody includes proper client information? Yes  No
- Chain of custody includes proper collection information and signatures? Yes  No
- Chain of custody includes dates and times of sample collection? Yes  No
- Chain of custody includes proper sample descriptions? Yes  No
- Chain of custody agrees with sample labels? Yes  No
- Chain of custody identifies proper sample matrix? Yes  No
- Chain of custody identifies proper number of samples? Yes  No
- Chain of custody includes required analysis? Yes  No
- Chain of custody signed when relinquished and received? Yes  No
- Samples are in proper containers/bottles? Yes  No
- Sample containers are intact? Yes  No
- Sufficient sample volume collected for requested analysis? Yes  No
- VOA vials for aqueous samples have zero headspace? Yes  No  Not Present
- Samples received within holding times? Yes  No
- Samples received on ice? Yes  No
- Sample properly preserved? Yes  No

If No, adjusted by? \_\_\_\_\_ Date/Time: \_\_\_\_\_

Remarks: \_\_\_\_\_

**ANY "NO" EVALUATION REQUIRES CLIENT NOTIFICATION (excluding After-Hours Receipt).**

Comments: \_\_\_\_\_