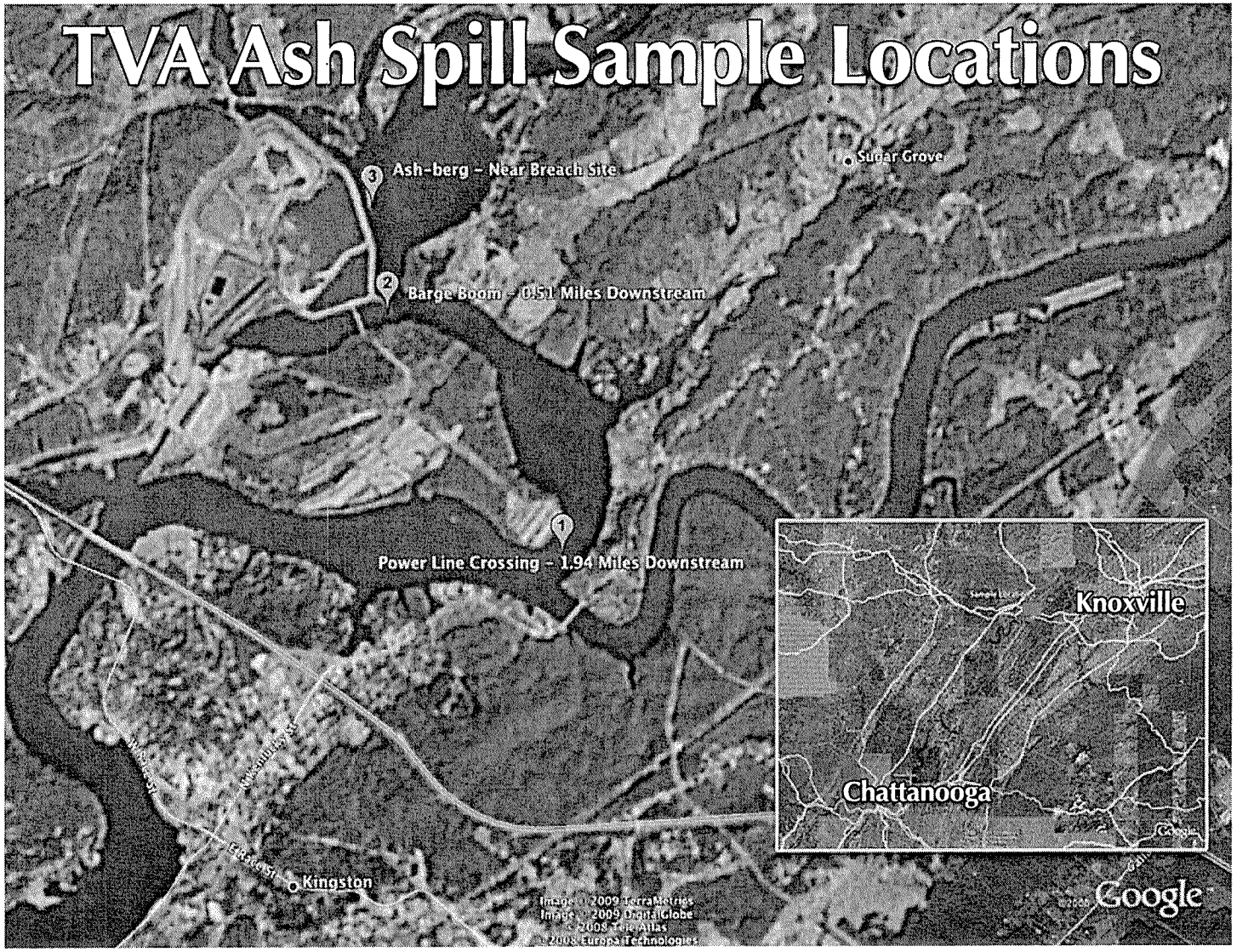
Results of ICP-OES analyses of the TVA ash spill samples collected 12-27-08 from the Emory River

Samples collected by Donna Lisenby (Appalachian Voices/Watauga Riverkeeper) and analyzed by Shea Tuberty, PhD and Carol Babyak, PhD (Appalachian State University)

		Water Samples			Sediment	TN Water Quality Standards (mg/L or ppm)		
		Power Line Crossing	Barge Boom	Ash-berg	Ash-berg			
Element	N=3	1.94 miles downstream	0.51 miles downstream	Near breach site	Near breach site	Domestic Water Supply	Fish & Aquatic Maximum (CMC)	Notes
Arsenic	mean	0.356	3.062	1.083	135.205	0.010	0.340	35 to 300 times higher than drinking water criteria
	std dev	0.063	0.572	0.082	4.363			3-10 times the max TN aquatic life criteria
Barium	mean	0.818	5.265	7.904	583.603	2.000	n/a	2 to 4 times higher than drinking water criteria
	std dev	0.214	0.424	0.920	11.576			
Cadmium	mean	0.001	0.014	0.008	0.985	0.005	0.002	0.25 to 3 times higher than drinking water criteria
	std dev	0.000	0.001	0.000	0.002			4-7 times the max TN aquatic life criteria
Chromium	mean	0.049	0.376	0.345	49.857	0.100	*	3.5 times higher than max drinking water criteria
	std dev	0.014	0.033	0.023	1.730			
Cobalt	mean	0.031	0.195	0.141	11.143	n/a	n/a	
	std dev	0.009	0.042	0.059	1.152			
Copper	mean	0.095	0.622	1.025	86.624	n/a	0.013	7-70 times the max TN aquatic life criteria
	std dev	0.019	0.058	0.121	3.217			
Iron	mean	28.004	151.917	122.988	18849.288	n/a	n/a	
	std dev	10.497	22.554	13.471	1009.305			
Lead	mean	0.029	0.137	0.313	25.931	0.005	0.065	6 to 60 times higher than max drinking water limit
	std dev	0.006	0.018	0.044	0.842			0.5 to 5 the max TN aquatic life criteria
Manganese	mean	1.172	10.893	1.705	92.870	n/a	n/a	
	std dev	0.003	0.249	0.007	2.794			
Mercury	mean	0.010	not detected	0.017	0.173	0.002	0.001	5 to 8 times higher than max drinking water limit
	std dev	0.013		0.022	0.088			7-12 the max TN aquatic life criteria
Molybdenum	mean	0.027	0.182	0.061	4.034	n/a	n/a	
	std dev	0.012	0.075	0.004	0.099			
Nickel	mean	0.046	0.339	0.363	40.016	0.100	0.470	3 times higher than max drinking water limit
	std dev	0.012	0.026	0.043	1.430			
Selenium	mean	0.005	0.036	0.042	2.598	0.050	0.020	0.25 to 2 the max TN aquatic life criteria
	std dev	0.001	0.007	0.013	0.558			
Silver	mean	not detected	not detected	not detected	0.021	n/a	n/a	
	std dev				0.008			
Thallium	mean	not detected	0.006	0.008	0.808	0.002	n/a	3 to 4 times higher than max drinking water limit
	std dev		0.000	0.003	0.449			
Vanadium	mean	0.196	1.280	1.388	124.074	n/a	n/a	
	std dev	0.050	0.128	0.145	3.257			
Zinc	mean	0.164	0.977	0.619	71.149	n/a	0.120	1.5 to 8 the max TN aquatic life criteria
	std dev	0.045	0.055	0.022	5.584			

not detected = no levels were found at the limits of our analytical instrumentation
n/a = there are no regulated levels of these elements in drinking water
*Fish and Aquatic criteria are speciated into Co III and Co IV but samples are not speciated

Sample exceeds one or more TN water quality criteria
Description of domestic drinking water criteria exceedence
Description of fish and aquatic criteria exceedence


TVA Ash Spill Sample Locations
Ash-berg - Near Breach Site
Sugar Grove
Barge Boom - 0.51 Miles Downstream
Power Line Crossing - 1.94 Miles Downstream
Knoxville
Chattanooga
Kingston
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Samples collected by Donna Lisenby (Appalachian Voices/Watauga Riverkeeper)
Samples analyzed by Professor Shea Tuberty, PhD and Professor Carol Babyak, PhD - Appalachian State University
Each field sample was used to prepare 3 replicate samples for analyses, means and standard deviations were calculated from these three replicates

	Water Samples from Emory River Sites			Ash Pile Sample
	Power Line Crossing	Barge Boom	Ash-berg	Ash-berg
Element	Water values are expressed in mg/L (or parts per million)			mg/kg dry ash wt
Arsenic	0.380	3.711	0.989	135.691
	0.285	2.635	1.116	139.304
	0.403	2.839	1.142	130.619
mean	**0.356**	**3.062**	**1.083**	**135.205**
std dev	**0.063**	**0.572**	**0.082**	**4.363**
Barium	0.916	5.750	8.649	570.244
	0.572	4.965	8.188	589.901
	0.965	5.079	6.876	590.665
mean	**0.818**	**5.265**	**7.904**	**583.603**
std dev	**0.214**	**0.424**	**0.920**	**11.576**
Cadmium	0.001	0.015	0.009	0.987
	0.001	0.013	0.009	0.985
	0.001	0.013	0.008	0.983
mean	**0.001**	**0.014**	**0.008**	**0.985**
std dev	**0.000**	**0.001**	**0.000**	**0.002**
Chromium	0.055	0.414	0.329	48.901
	0.033	0.358	0.371	48.815
	0.058	0.356	0.336	51.854
mean	**0.049**	**0.376**	**0.345**	**49.857**
std dev	**0.014**	**0.033**	**0.023**	**1.730**
Cobalt	0.035	0.169	0.207	9.891
	0.021	0.243	0.121	12.158
	0.037	0.172	0.094	11.381
mean	**0.031**	**0.195**	**0.141**	**11.143**

std dev	**0.009**	**0.042**	**0.059**	**1.152**
Copper	0.105	0.689	1.120	83.573
	0.073	0.581	1.066	89.985
	0.108	0.596	0.890	86.314
mean	**0.095**	**0.622**	**1.025**	**86.624**
std dev	**0.019**	**0.058**	**0.121**	**3.217**
Iron	32.638	177.875	117.263	18575.140
	15.988	137.125	138.375	18005.377
	35.388	140.750	113.325	19967.345
mean	**28.004**	**151.917**	**122.988**	**18849.288**
std dev	**10.497**	**22.554**	**13.471**	**1009.305**
Lead	0.031	0.157	0.347	25.070
	0.023	0.126	0.329	26.752
	0.035	0.128	0.264	25.970
mean	**0.029**	**0.137**	**0.313**	**25.931**
std dev	**0.006**	**0.018**	**0.044**	**0.842**
Manganese	1.179	11.075	1.758	89.838
	1.144	10.609	1.729	93.430
	1.193	10.994	1.630	95.342
mean	**1.172**	**10.893**	**1.705**	**92.870**
std dev	**0.025**	**0.249**	**0.067**	**2.794**
Mercury	0.020	not detected	0.042	0.273
	0.001	not detected	0.006	0.141
	not detected	not detected	0.004	0.105
mean	**0.010**		**0.017**	**0.173**
std dev	**0.013**		**0.022**	**0.088**
Molybdenum	0.032	0.267	0.060	4.082
	0.012	0.127	0.057	4.100
	0.035	0.153	0.065	3.920
mean	**0.027**	**0.182**	**0.061**	**4.034**
std dev	**0.012**	**0.075**	**0.004**	**0.099**

Nickel	0.052	0.369	0.395	38.479
	0.033	0.322	0.380	40.262
	0.055	0.328	0.313	41.308
mean	**0.046**	**0.339**	**0.363**	**40.016**
std dev	**0.012**	**0.026**	**0.043**	**1.430**
Selenium	0.006	0.044	0.026	2.275
	0.004	0.030	0.049	3.242
	0.006	0.035	0.050	2.277
mean	**0.005**	**0.036**	**0.042**	**2.598**
std dev	**0.001**	**0.007**	**0.013**	**0.558**
Silver	not detected	not detected	not detected	0.027
	not detected	not detected	not detected	0.012
	not detected	not detected	not detected	0.024
mean				**0.021**
std dev				**0.008**
Thallium	not detected	0.006	0.007	1.158
	not detected	0.006	0.007	0.965
	not detected	0.006	0.011	0.302
mean		**0.006**	**0.008**	**0.808**
std dev		**0.000**	**0.003**	**0.449**
Vanadium	**0.219**	1.426	1.221	120.404
	0.139	1.188	1.479	126.617
	0.230	1.225	1.464	125.202
mean	**0.196**	**1.280**	**1.388**	**124.074**
std dev	**0.050**	**0.128**	**0.145**	**3.257**
Zinc	0.182	1.037	0.644	65.887
	0.113	0.930	0.612	70.551
	0.198	0.964	0.602	77.007
mean	**0.164**	**0.977**	**0.619**	**71.149**
std dev	**0.045**	**0.055**	**0.022**	**5.584**