US EPA ARCHIVE DOCUMENT

SITE: TVA Kingston
BREAK: 2.2
OTHER:

Department of Environment & Conservation

Jim Fyke, Commissioner

US EPA ARCHIVE DOCUMENT

Ash Slide at TVA Kingston Fossil Plant

We have reviewed the results from analyses of the soil and ash samples. None of the soil samples had levels of contaminants that presented either an acute or chronic health hazard to public health.

TDEC did not find any volatile organic chemicals or polynuclear aromatic hydrocarbons in the ash samples. The ash does contain metals and radioactive materials. We compared the ash sample results with the level of metals and radioactivity in local soil. We reviewed toxicity information and compared the sample results for metals and radioactivity with the levels of each metal and radioactive material that impact human health. We also worked with the Tennessee Department of Health to determine the risk of the ash to public health.

First, the ash from the landfill presents a threat to human health when the ash dries and becomes airborne as dust. The inhalation risk to human health is due to the physical structure of the ash. It is mostly silica dioxide, iron oxide, aluminum oxide and magnesium oxide; the ash consists of very fine particles. If inhaled, the ash can be trapped in the lungs. As long as the ash is wet and covered, then the dust hazard is eliminated. For further information please refer to the Material Safety Data Sheet for Ash for Flyash.

After review of the metal analyses of the ash samples, the only metal at levels that present a health hazard is Arsenic. The ash contains, on average, 74 ppm Arsenic. The concentration of Arsenic in local soil is approximately 2 ppm. We have consulted with the Tennessee Department of Health and reviewed information from the U.S. Environmental Protection Agency about the effect of Arsenic, at this level, on human health. The presence of Arsenic at 74 parts per million in the ash does not present an immediate (acute) threat to human health. TDEC and the Department of Health believe that, based on current sampling results, there should be no adverse health effects from accidentally and occasionally ingesting the ash. However, we encourage everyone to avoid contact with coal ash. If you do have contact with the ash, then practice good hygiene, especially washing your hands before eating. Remember, the metals are bound to the ash. Cleaning up the ash like you would clean up clinging mud will be effective in removing the hazard.
The Arsenic in the ash does not easily dissolve into water, so movement of Arsenic through ground water into local water wells is not likely. However, Environment and Conservation is testing wells in the area and is identifying wells that will be retested regularly over time, helping us to identify problems before anyone's water well is impacted.

While TVA works to clean up the ash from this release under the oversight of the Department of Environment and Conservation, people should not go into areas where the ash is on the ground. The ash is being covered by grass or a ground cover to prevent it from becoming dust. Vehicles and equipment leaving the ash removal area will be washed to prevent ash from accumulating on local roads. For more information about the precautions the department has directed TVA to take to control dust, please visit the Air Monitoring Results page of this Web site.

Lab Results Worksheet - Jan. 6 & Jan. 7, 2009

Department Information
TDEC Kingston Home
Ash Analysis & Historical Reporting
Commissioner's Order
Community Guidance
Enforcement and TVA Submittals
Monitoring Plans
Results Reporting

Helpful Links
- Roane County Government
- TVA Kingston Update
- TN Department of Health
- TN Wildlife Resources Agency
- U.S. EPA Kingston Update
- U.S. EPA On-site Coordinator Kingston

Results
Air Monitoring Results
Soil and Ash Results
Surface Water Results
Water Treatment Results

Tennessee State Parks

From Governor Phil Bredesen's Desk
- Bredesen's Webpage
- Health Care for Kids

Transparency

TNRecovery.gov
Open Government

TDOT smartway
Traffic and Road Conditions

Featured Sites
- Outreach Initiatives
- Recovery Act
- TVA Kingston Update

Agency Services
- Radon Program
- Revolving Loan Fund
- Solid Waste Assistance

TN.GOV Services
- Renew Driver's License
- One Stop Business Registration

More

TN.GOV Services | TN.GOV Directory | Web Policy | Accessibility | Awards | Survey

Department of Environment & Conservation | 401 Church Street | L&C Tower | Nashville, TN 37243 | (888) 891-TDEC (8332) | ask.tdec@tn.gov

http://tn.gov/environment/kingston/metals.shtml

US EPA ARCHIVE DOCUMENT

Ash Sample Results for TVA Kingston

Sample Point	TVK SL 01	TVK SS 01	TVK SL 02	TVK SS 02	TVK SL 03	TVK SS 03	TVK SL 04	TVK SS 04	TVK SL 05	TVK SS 05	TVK SL 06	TVK SS 06	TVK SL 07MSMSD	TVK SL 07	TVK SS 07	TVK SL 08	TVK SS 08
Soil or Ash	Ash	Soil	Ash	Soil	Ash	Soil	Ash	Soil	Ash	Soil	Ash	Soil	Ash	Ash	Soil	Ash	Soil
Sample Date	1/6/2009	1/6/2009	1/6/2009	1/6/2009	1/6/2009	1/6/2009	1/6/2009	1/6/2009	1/7/2009	1/6/2009	1/7/2009	1/6/2009	1/7/2009	1/7/2009	1/6/2009	1/7/2009	1/6/2009
Sampling Org.	TDEC	TDEC	TDEC	TDEC	TDEC	TDEC	TDEC	TDEC	TDEC	TDEC	TDEC	TDEC	TDEC	TDEC	TDEC	TDEC	TDEC
Laboratory	State Lab	State Lab	State Lab	State Lab	State Lab	State Lab	State Lab	State Lab	State Lab	State Lab	State Lab	State Lab	State Lab	State Lab	State Lab	State Lab	State Lab
Street Address	199 Lakeshore	30ft NW of Headwaters	190 Lakeshore	Roane Co Park	178 Lakeshore	199 Lakeshore	166 Lakeshore	190 Lakeshore	208 Swan Pond Cir	178 Lakeshore	206 Swan Pond Cir	172 Lakeshore	188 Swan Pond Cir	188 Swan Pond Cir	170 Lakeshore	148 Swan Pond Cir	166 Lakeshore
Total Metals (mg/kg)																	
Aluminum (Al)	15000	6700	19000	1300	22000	9200	17000	11000	11000	8200	20000	6600	15000	16000	7200	13000	6400
Antimony (Sb)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Arsenic (As)	83	0	72	2	100	5.6	85	4.9	71	3.7	92	3.1	77	63	4.8	83	2.8
Barium Ba)	270	84	280	55	330	87	270	82	180	55	330	22	250	260	21	240	28
Berylium (Be)	1.8	0.4	3.2	0.7	3.6	0.4	2.8	0.4	1.7	0.2	3.6	0.1	2.5	2.7	0	2	0
Cadmium (Cd)	0	0	0	0.7	0.2	0	0.2	0	0	0	0	0	0	0	0	0	0
Calcium (Ca)	3400	710	3300	680	4000	1400	2900	1100	2200	1400	3400	2000	2800	2500	210	2500	700
Chromium (Cr)	23	10	27	25	31	11	24	12	17	11	27	8.6	20	22	9.2	19	8
Cobalt (Co)	13	9	15	29	18	10	14	8.6	9.5	8.1	14	2.8	8.9	8.6	2.3	9.1	2.9
Copper (Cu)	43	3	50	18	58	2.8	46	6.2	34	1.3	53	2.3	34	40	2.6	32	1.1
Iron (Fe)	11000	13000	11000	26000	13000	11000	13000	14000	13000	12000	14000	13000	21000	10000	13000	12000	8800
Lead (Pb)	19	13	24	16	29	30	23	33	11	14	21	7.2	16	15	8.6	15	10
Lithium (Li)	28	3.5	32	7.2	36	4.7	30	5.9	20	4.6	26	3.6	19	19	4.6	22	4
Magnesium (Mg)	1300	800	1400	19000	1600	530	1300	640	810	530	1300	5500	850	850	300	1000	380
Manganese (Mn)	120	490	79	1100	83	1600	95	1300	260	630	89	89	99	67	52	56	150
Mercury (Hg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Molybdenum (Mo)	1.6	0	2.8	1.1	3.5	0.8	4.9	0	5.3	0	0	0	1.1	0	0	1.6	0
Nickel (Ni)	24	4.2	28	15	32	4.5	24	5.2	14	2.8	28	1.4	15	17	1.9	17	1
Selenium (Se)	0	0	0	2	2.2	2.9	0	5.3	0	0	0	0	0	0	0	0	0
Silver (Ag)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Strontium (Sr)	200	6.7	240	3.9	260	6	210	4.7	150	5.7	220	4	180	190	2.3	200	3.8
Thallium (Th)	0	0	1.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uranium	2.6	0.4	3.3	0.51	3.6	0.85	3	0.84	2.3	0.77	4	0.66	3.6	3.8	0.67	3.3	0.54
Vanadium (V)	66	15	78	26	94	20	73	23	44	21	87	17	61	66	19	57	15
Zinc (Zn)	37	19	43	29	54	30	44	47	33	24	47	16	28	28	22	30	20
TCLP Metals	1		2		3		4		5		6		7	7A		8	
Arsenic (As)	0.16	NA	0.083	NA	0.06	NA	0.041	NA	0.053	NA	0.015	NA	0.0017	1.5	NA	0.048	NA
Barium Ba)	0.86	NA	0.96	NA	1.4	NA	0.9	NA	0.77	NA	0.071	NA	0.22	0.047	NA	0.15	NA
Cadmium (Cd)	0	NA	0	NA	0.0092	NA	0	NA	0	NA	0	NA	0	0	NA	0	NA
Chromium (Cr)	0.002	NA	0.0042	NA	0.0028	NA	0.0028	NA	0.0025	NA	0.0028	NA	0	0	NA	0	NA
Lead (Pb)	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	0	NA	0	NA

US EPA ARCHIVE DOCUMENT

Ash Sample Results for TVA Kingston

Sample Point	TVK SL 09	TVK SS 09	TVK SL 10	TVK SS 10	TVK SL 11	TVK SS 11	TVK SL 12	TVK SS 12	TVK SS 12MSMSD	TVK SS 13	TVK SS 14	TVK SS 15	AVG Soil	Avg Ash
Soil or Ash	Ash	Soil	Ash	Soil	Ash	Soil	Ash	Soil	Soil	Soil	Soil	Soil		
Sample Date	1/7/2009	1/6/2009	1/7/2009	1/7/2009	1/12/2009	1/7/2009	1/12/2009	1/7/2009	1/7/2009	1/7/2009	1/7/2009	1/7/2009		
Sampling Org.	TDEC	TDEC	TDEC	TDEC	TDEC	TDEC	TDEC	TDEC	TDEC	TDEC	TDEC	TDEC		
Laboratory	State Lab	State Lab	State Lab	State Lab	State Lab	State Lab	State Lab	State Lab	State Lab	State Lab	State Lab	State Lab		
Street Address	129 Swan Pond Cir	162 Lakeshore	137 Berkshire	208 Swan Pond Cir	Landfill location 1	206 Swan Pond Cir	Landfill location 2	194 Swan Pond Cir	194 Swan Pond Cir	129 Swan Pond Cir	134 Berkshire	137 Berkshire		
Total Metals (mg/kg)														
Aluminum (Al)	1000	9700	1200	11000	21000	15000		1600	17000	7000	8100	8700	8418.75	14266.67
Antimony (Sb)	0	0	0	0	0	0	2.4	0	0	0	0	0	0.00	0.00
Arsenic (As)	57	6.4	56	0	93	0	26	0	0	0	0	0	2.08	77.67
Barium Ba)	210	39	310	180	510	150	1100	140	160	42	85	31	78.81	286.67
Berylium (Be)	1.5	0.1	2.2	0.7	4.9	1.1	7.9	0.7	0.7	0.3	0.3	0.1	0.39	2.71
Cadmium (Cd)	0	0	0	0	0	0.1	0	0.6	0.6	0	0	0	0.13	0.03
Calcium (Ca)	2000	1300	4600	3700	6100	950	27000	2000	2800	770	1800	520	1377.50	3308.33
Chromium (Cr)	16	16	20	11	31	20	43	33	33	8	11	11	14.86	23.08
Cobalt (Co)	6.7	3.7	8.4	11	16	16	29	15	16	1.9	5.8	0.9	8.94	11.77
Copper (Cu)	25	4	30	120	73	3.1	76	5.8	6.6	0	2.9	0	11.23	43.17
Iron (Fe)	10000	18000	13000	16000	15000	31000	14000	41000	4000	9000	13000	14000	16050.00	13000.00
Lead (Pb)	10	14	9.8	20	26	12	24	8.7	11	5	9.6	4.4	13.53	18.23
Lithium (Li)	16	6.2	17	4.4		10		20	21	2.8	3.4	3.7	6.85	22.08
Magnesium (Mg)	730	380	1300	940	1400	1700	6400	4000	4400	360	640	380	2530.00	1153.33
Manganese (Mn)	67	180	130	2900	67	2600	73	570	850	220	1200	130	878.81	101.00
Mercury (Hg)		0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Molybdenum (Mo)	0	0.6	0	0		0		0	0	0	0	0	0.16	1.73
Nickel (Ni)	13	2.3	15	7.5	29	13	37	19	22	0	2.2	0	6.38	21.33
Selenium (Se)	0	0	0	0	0	0	0	0	0	0	0	0	0.64	0.18
Silver (Ag)	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Strontium (Sr)	130	6.3	220	18		10		13	15	3.1	6.4	2.6	6.97	183.33
Thallium (Th)	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.15
Uranium	2.4	1	2.6	0.71		0.72		0.46	0.44	0.85	0.71	0.98	0.69	2.88
Vanadium (V)	42	27	58	19	110	27	150	28	27	16	17	21	21.13	69.67
Zinc (Zn)	25	24	29	44	48	40	67	54	57	9.7	46	13	30.92	37.17
TCLP Metals	9		10		11		12							
Arsenic (As)	0.015	NA	0.058	NA	0	NA	0.0038	NA	NA	NA	NA	NA		
Barium Ba)	0.63	NA	1.4	NA	0.1	NA	5.5	NA	NA	NA	NA	NA		
Cadmium (Cd)	0	NA	0	NA	0.0012	NA	0	NA	NA	NA	NA	NA		
Chromium (Cr)	0	NA	0	NA	0	NA	0.23	NA	NA	NA	NA	NA		
Lead (Pb)	0	NA	0	NA	0.0013	NA	0	NA	NA	NA	NA	NA		

US EPA ARCHIVE DOCUMENT

Ash Sample Results for TVA Kingston

Sample Point	TVK SL 01	TVK SS 01	TVK SL 02	TVK SS 02	TVK SL 03	TVK SS 03	TVK SL 04	TVK SS 04	TVK SL 05	TVK SS 05	TVK SL 06	TVK SS 06	TVK SL 07MSMSD	TVK SL 07	TVK SS 07	TVK SL 08	TVK SS 08
Mercury (Hg)	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	0	NA	0	NA
Selenium (Se)	0.012	NA	0.0046	NA	0.0032	NA	0	NA	0	NA	0.004	NA	0	0	NA	0.0027	NA
Silver (Ag)	0	NA	0	NA	0.0005	NA	0	NA	0	NA	0	NA	0	0	NA	0	NA
Gamma Scan																	
Ac-228	3.43	1.6	3.5	2.08	3.42	1.31	3.35	1.041	2.47	1.44	3.05	0.94	2.51	2.62	0.704	2.82	1
Pb-214	5.34	1.432	5.45	1.036	4.56		5.09	1.29	3.37	1.44	4.52	0.896	3.7	3.76	0.744	3.533	0.89
pb-210																	
Bi-212	2.66	1.08	2.74		1.96		2.27				1.89	0.97	1.83	2.06	0.68	1.73	
Bi-214	4.62	1.38	4.82	1.08	4.42	1.146	4.15	1.038	2.89	1.24	4.07	0.732	3.236	3.353	0.698	3.49	0.939
K-40	25.76	13.69	23.8	42.3	20.53	8.62	20.57	6.71	16.67	7.1	18.64	4.81	16	15.69	4.36	17.09	
Cs-137		0.624								0.423							
Ti-208	1.179		1.235	0.671	0.989		1.035	0.408	0.836	0.458	0.926	0.345	0.844	0.908		0.943	
Pb-212	3.753	1.322	3.837	2.02	3.096	1.195	3.036	1.128	2.537	1.207	2.789	0.792	2.565	2.652	0.759	2.636	0.857
Ra-226																	
Ra-228																	
Total Ra																	
Total Rad Activity																	
Radioactivity																	
Gross Alpha	5.6	4.6	6.8	6.8	6.3	4.8	9.6	3.73	5.3	3.7	7	2.94	4.11	6.3	3.7	7.7	2.94
Gross Beta	5.3	4.61	5.45	5.6	5.33	3.51	6.2	2.87	2.51	4.22	4.1	2.31	3.18	3.4	3.77	3.28	3.24
PNAs																	
Acenaphthene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acenaphthylene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anthracene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Benzo(a)anthracene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Benzo(a)pyrene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Benzo(b)fluoranthene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Benzo(g,h,i)perylene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Benzo(k)fluoranthene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chrysene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dibenzo(a,h)anthracene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fluoranthene 206-44-0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fluorene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Indeno(1,2,3-cd)pyrene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Naphthalene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phenanthrene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pyrene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uranium																	
VOC - Benzene																	
VOC - Toluene																	
VOC-Xylenes																	
VOC-Ethylbenzene																	

US EPA ARCHIVE DOCUMENT

Ash Sample Results for TVA Kingston

Sample Point	TVK SL 09	TVK SS 09	TVK SL 10	TVK SS 10	TVK SL 11	TVK SS 11	TVK SL 12	TVK SS 12	TVK SS 12MSMSD	TVK SS 13	TVK SS 14	TVK SS 15	AVG Soil	Avg Ash
Mercury (Hg)	0	NA	0	NA	0	NA	0	NA	NA	NA	NA	NA		
Selenium (Se)	0.0028	NA	0	NA	0	NA	0.0028	NA	NA	NA	NA	NA		
Silver (Ag)	0	NA	0	NA	0	NA	0	NA	NA	NA	NA	NA		
Gamma Scans														
Ac-228	2.59	1.16	2.78	1.76	3.76	1.81	2.91	2.45	2.28	1.076	1.35	1.55	1.47	3.02
Pb-214	3.426	1.1	4	1.437	6.52	1.334	3.58	1.5	1.39	0.917	1.067	1.13	1.10	4.37
pb-210														
Bi-212			1.75		3.08	1.36				1.3		1.171	0.41	1.69
Bi-214	3.269	0.944	3.76	1.434	5.96	1.261	3.12	1.26	1.25	0.831	1.1	1.151	1.09	3.94
K-40	16.56	6.8	16.56	8.48	19.36	12.31	14.62	29.7	30.2	4.06	7.2	5.02	11.96	18.60
Cs-137		0.282		0.484									0.11	0.00
Ti-208	0.843	0.422	0.888	0.443	1.239		1.08	0.728		0.31	0.412	0.417	0.29	1.00
Pb-212	2.368	1.12	2.731	1.324	3.765	1.769	2.628	2.33	2.28	0.828	1.244	1.367	1.35	2.95
Ra-226														
Ra-228														
Total Ra														
Total Rad Activity														
Radioactivity														
Gross Alpha	4.6	2.78	6.9	5.9	16.8	5	25	3.8	10.7	1.76	4.4	2.59	4.38	7.25
Gross Beta	1.88	2.61	3.21	3.02	10	1.98	6.5	2.35	4.5	0.76	2.41	0.79	3.03	4.49
PNAs														
Acenaphthene	0	0	0	0	0	0		0	0	0	0	0		
Acenaphthylene	0	0	0	0	0	0		0	0	0	0	0		
Anthracene	0	0	0	0	0	0		0	0	0	0	0		
Benzo(a)anthracene	0	0	0	0	0	0		0	0	0	0	0		
Benzo(a)pyrene	0	0	0	0	0	0		0	0	0	0	0		
Benzo(b)fluoranthene	0	0	0	0	0	0		0	0	0	0	0		
Benzo(g,h,i)perylene	0	0	0	0	0	0		0	0	0	0	0		
Benzo(k)fluoranthene	0	0	0	0	0	0		0	0	0	0	0		
Chrysene	0	0	0	0	0	0		0	0	0	0	0		
Dibenzo(a,h)anthracene	0	0	0	0	0	0		0	0	0	0	0		
Fluoranthene 206-44-0	0	0	0	0	0	0		0	0	0	0	0		
Fluorene	0	0	0	0	0	0		0	0	0	0	0		
Indeno(1,2,3-cd)pyrene	0	0	0	0	0	0		0	0	0	0	0		
Naphthalene	0	0	0	0	0	0		0	0	0	0	0		
Phenanthrene	0	0	0	0	0	0		0	0	0	0	0		
Pyrene	0	0	0	0	0	0		0	0	0	0	0		
Uranium														
VOC - Benzene														
VOC - Toluene														
VOC-Xylenes														
VOC-Ethylbenzene														