PRELIMINARY

United States Geological Survey
Certificate of Analysis
Brush Creek Shale, SBC-1

Material used in the preparation of SBC-1 was collected in 1999 under the direction of Roger Hornberger (Pennsylvanian Department Environmental Quality) and Stephen Wilson, USGS. The collection site was a fresh road cut located in Westmoreland County, near Greensburg PA at the intersection of routes 66 and 130. SBC-1 is representative of marine shale of the lower Conemaugh Group, Glenshaw formation. Mineralogical analysis of SBC-1 reveals major concentrations of muscovite, quartz, kaolinite, and chlorite with minor amounts of calcite, siderite, anatase, rutile, and pyrite.

Certificate information is derived from the proficiency testing program called GEOPT which is directed by the International Association of Geoanalysts. A total of 75 laboratory participated in the study. Certificate values are representative of robust study means and are confirmed by USGS analysis.

Oxide	Wt%	s.d.
SiO_2	47.64	0.087
Al_2O_3	21.0	0.04
Fe_2O_3T	9.71	0.02
CaO	2.95	0.01
MgO	2.60	0.01
K_2O	3.45	0.01
Na_2O	<0.15	
MnO	0.15	0.001

Oxide	Wt%	s.d.
P_2O_5	0.37	0.002
TiO_2	0.855	0.003
S_{tot}	0.715	0.008
C_{tot}	2.08	0.02
C_{inorg}	0.85	0.01
C_{org}	1.23	0.02
LOI	10.2	0.08

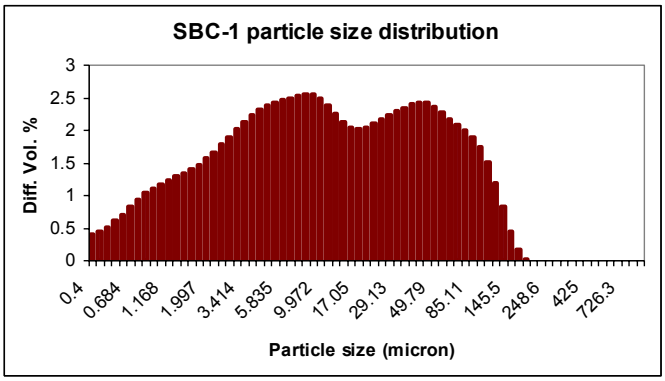
Element	mg/kg	s.d.
As	25.7	0.7
Ba	788	7.7
Be	3.2	0.08
Bi	0.7	0.02
Cd	0.4	0.02
Ce	108	0.9
Co	22.7	0.3
Cr	109	1
Cs	8.2	0.1
Cu	31	0.6
Dy	7.1	0.09
Er	3.8	0.05
Eu	1.98	0.02
Ga	27	0.3
Gd	8.5	0.1

Element	mg/kg	s.d.
Hf	3.7	0.1
Ho	1.4	0.02
La	52.5	0.6
Li	163	2.5
Lu	0.54	0.01
Mo	2.4	0.07
Nb	15.3	0.2
Nd	49.2	0.5
Ni	82.8	0.8
Pb	35	0.3
Pr	12.6	0.1
Rb	147	1
Sb	1.01	0.03
Sc	20	0.2
Sm	9.6	0.1

Element	mg/kg	s.d.
Sn	3.3	0.1
Sr	178	1.4
Ta	1.1	0.03
Tb	1.2	0.02
Th	15.8	0.2
Tl	0.89	0.01
Tm	0.56	0.01
U	5.76	0.11
V	220	1.4
W	1.6	0.05
Y	36.5	0.3
Yb	3.64	0.04
Zn	186	1.7
Zr	134	1.6

(over)

Mineralogy	Wt, %
Muscovite	34
Quartz	18
Chlorite	14
Kaolinite	18
Calcite	3.2
Siderite	3.3
Anatase	3.8
Rutile	3.4
Pyrite	3.1



Glossary

Wt, %	Weight percent
mg/kg	milligram per kilogram
s.d.	Standard deviation
LOI	Loss on ignition (925º C)
C_{inorg}	Inorganic form of carbon, i.e. carbonate
C_{org}	Organic form of carbon, difference between Total carbon and inorganic carbon
Stot	Total sulfur

Bibliography

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