



**United States Geological Survey
Certificate of Analysis**

Cody Shale, SCo-1

Sample used in the preparation of this reference material was collected in Natrona County, Wyoming, near the Naval Petroleum Reserve at Teapot Dome. SCo-1 is typical of the Upper Cretaceous silty marine shales, intermediate between fine-grained offshore shales and coarser nearshore marine siltstones. The rock is a medium dark-gray (Munsel N-4) silty shale having thin lighter colored silty laminations (Flanagan, 1976).

The concentrations were determined by cooperating laboratories using a variety of analytical methods. Values reported are derived from international data compilations (Abbey, 1983, Gladney and Roelandts, 1988, Govindaraju, 1994). Initial USGS reports (Flanagan, 1976) provide background information on sample collection location.

Recommended values

Oxide	Wt %	±	Oxide	Wt %	±
SiO ₂	62.8	0.66	CaO	2.62	0.20
Al ₂ O ₃	13.7	0.21	MgO	2.72	0.18
Fe ₂ O ₃	4.19	0.19	Na ₂ O	0.90	0.06
FeO	0.90	0.16	K ₂ O	2.77	0.08
Fe ₂ O ₃ T	5.13	0.18	P ₂ O ₅	0.21	0.02
			TiO ₂	0.63	0.06

Element	µg/g	±	Element	µg/g	±	Element	µg/g	±
As	12	1	F	770	60	S _{tot}	630	90
B	72	6	La	30	1	Sb ^{tot}	2.5	0.1
Ba	570	30	Li	45	3	Sc	11	1
Cs	7.8	0.7	Mn	410	30	Sr	170	16
Be	1.8	0.2	Mo	1.4	0.2	Th	9.7	0.5
Ce	62	6	Nd	26	2	V	130	13
Co	11	0.8	Ni	27	4	Y	26	4
Cr	68	5	Pb	31	3	Zn	100	8
Cu	29	2	Rb	110	4	Zr	160	30

Element	µg/g	Element	µg/g
Bi	0.37	Pr	6.6
Cl	51	S	630
Ga	15	Sn	3.7
Nb	11	W	1.4

Bibliography

Abbey, S., 1983, Studies in "Standard Samples" of Silicate Rocks and Minerals 1969-1982, Canadian Geological Survey paper 83-15, p-114.

Flanagan, F.J., 1976, Descriptions and Analyses of Eight New USGS Rock Standards, U.S. Geological Survey Professional Paper 840, p 192

Gladney, E.S., and Roelandts, I., 1988, 1987 Compilation of Elemental Concentration Data for USGS BHVO-1, MAG-1, QLO-1, RGM-1, SCo-1, SDC-1, SGR-1, and STM-1, Geostandards Newsletter, 12: 253-362.

Govindaraju, K., 1994, 1994 Compilation of Working Values and Descriptions for 383 Geostandards, Geostandards Newsletter, 18:1-158

Glossary

Fe ₂ O ₃ T	Total iron expressed as Fe ₂ O ₃
C _{tot}	Total carbon concentration
S _{tot}	Total sulfur concentration
Wt %	Percent of total element concentration
µg/g	Total element concentration expressed as micrograms of element per gram of solid sample
±	One standard deviation

Notes

Unless otherwise indicated total element concentrations are reported for material on an as-received basis, i.e., no drying.

Ordering Information

USGS reference materials (RMs) may be obtained directly from Dr. Stephen A. Wilson at the address or numbers listed below. The price for each bottle of RM is \$65.00 (U.S.) **except** DGPM-1 which is \$150.00 (U.S.). This cost includes all shipping and handling charges using normal mail delivery. Urgent requests for RMs should be initiated by FAX or e-mail. If required, overnight delivery is available with these charges added to the final bill.

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URL: <http://minerals.cr.usgs.gov/geochem/codyshale.pdf>

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