

Selenium Location and Mode of Occurrence in the Kanawha Formation Rocks in West Virginia

Dorothy J. Vesper and Mimi Roy, West Virginia University

Detailed measurements of Se concentration and mode of occurrence were conducted for a single rock core from a WV coal mine (Roy 2005). The core data spanned the Coalburg and Winifrede coal zones in the Kanawha Formation. The highest concentrations of total Se were detected in the upper Winifrede coal beds and the Winifrede riders. The rock types with the highest total Se were carboliths, coal, and shale. The shales located proximate to the coal were generally higher in Se than those located further from the coals. This relationship is consistent with data and conclusions by Mullennex (2005) indicating that the importance of coal-proximate layers to Se presence and concentration is not limited to the single core of this study. The highest concentrations of Se were found in samples with a net neutralization potential from -5 to +5 tons/1000 tons but no significant relationship was found between total Se with either sulfur or total organic carbon.

The Se mode of occurrence was determined via a 5-step procedure modified from Martens and Suarez (1998; details in Roy 2005). The fractions targeted by the procedure were soluble, exchangeable, associated with oxide coatings, organically-bound, and sulfide-bound. Selenium in the coals was primarily found in the sulfide-fraction; Se in shale was primarily in the organically-bound fraction. The total Se extracted by the procedure depended on the rock type and proximity to the coal, not on the total concentration present. This study is intended to identify source mode, not environmental leaching, and therefore are likely overestimates of release in the environment.

References Cited

- Martens DA and Suarez DL (1998) Chapter 4. Sequential extraction of selenium oxidation states. In: Frankenberger WTJ and Engberg RA (eds) Environmental Chemistry of Selenium. Marcel Dekker, Inc., New York: 61-79
- Mullennex R (2005) Stratigraphic Distribution of Selenium in Upper Kanawha-Lower Allegheny Formation Strata at a Location in Southern West Virginia. The 23rd Annual International Pittsburgh Coal Conference, Pittsburgh PA, Sept. 15-18
- Roy M (2005) A detailed sequential extraction study of selenium in coal and coal-related strata from a coal mine in West Virginia. Masters Thesis, University of West Virginia, Morgantown, 93 p.