Geochemical and lead isotope studies of sediments from the Tar Creek and Neosho River: Effects of mining the Mississippi Valley-type ores in the Tri-State district

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Mississippi Valley-Type (MVT) lead-zinc deposits, which account for 24 % of the global resources for Pb and Zn deposits, are found throughout the world with the largest deposits occurring in North America [1]. The Tri-State Mining district in the intersection of Oklahoma, Kansas, and Missouri, was one of the most productive Pb and Zinc mines during the turn of the 20th century. Biochemical studies [2] [3] in the Tri-State mining district region (designated as a Superfund site in 1983) have shown conclusively that the area is contaminated with Pb, Cd, and Zn from mining, milling, and smelting, which has contributed to the poisoning of birds, fish, wildlife, and local populations.

Current geochemical studies of ore samples from the Tri-State district and of stream-sediment samples and cores collected from selected sites from the mid-Arkansas River drainage basin (the Neosho River, Tar Creek, and Spring River) show that the effect of mining activity on Pb concentrations in the river can be readily documented. Lead isotopic ratios of leaches of stream sediments correlate well with those of ore samples, suggesting a common source. There is also a gradual decrease in the Pb concentration with distance from the mines, as well as with depth of the cores.

[1] Leach et al. (2010) *USGS Sci. Invest. Report, 52 p.* [2] Beyer et al. (2004) *Arch. Environ. Contam. Toxicol.* **48**, *108-117.* [3] Schmitt et al. (2005) *Environ. Toxicol. Chem* **6**, 1483-1495.