2009 Tri-State Mining District Transition Zone Assessment Study

November 3, 2009
Objectives

- Determine extent of soil degradation from mining operations.
  - Obtain data on metal concentrations for soil samples in depositional areas of the TSMD.
  - Verify results by submitting duplicates for ICP/AES analysis.
- 240 samples collected from 17 sites
  - 6-KS
  - 5-MO
  - 6-OK

- Sites selected using different variables
  - Surrounding land use
  - Proximity to other piles/bases
Methods

- Maps of chat piles/bases were used to determine the start of each transect
  - EPA delineated boundary
- Transects extended from piles in four opposing directions
  - Was not possible at all sites-2 directions used
- XRF reading taken at mapped boundary
- First soil sample taken 50’ from boundary and at 50’ intervals
- Transect sampling continued until 2 consecutive samples below background
  - Above DL Cd
  - 90ppm Pb
  - 440ppm Zn
Methods

- Sampling depth 1-6"
- Detritus removed and samples placed in 1-L zip-loc baggies
- Samples returned to lab and individually dried @105°C
- Analyzed with handheld XRF
Oklahoma CP 025 Transects
Missouri Pile (Wooded Land Use)
Preliminary Results

- 46 Total transects
  - Longest- 600’

- 50’
  - 39 (85%) over BKG
  - 30 (65%) over EPA cleanup levels

- 200’
  - 21 (45.6%) over BKG
  - 14 (30.4%) over EPA cleanup levels
Preliminary Results

- 160 Samples over BKG levels
- 112 Samples over EPA cleanup levels
- 70% of samples over BKG were also over EPA cleanup levels
Confirmatory Samples

- 19 Samples sent to Texas A&M

- EPA Method 6200- Field Method for Soil and Sediment
  - Least squares linear regression
  - Requires $r^2 = 0.7$ or greater
  - TZ data was log transformed Pb and Zn $r^2 > 0.9$
  - Still working on Cd
Next Steps

- Further analysis
  - Classify contamination by distance
  - Classify by land use
  - Compare to injury levels
  - Determine Cd/Zn

- Accurate account of contaminated acres