

## RELATIONSHIP BETWEEN SOIL SELENIUM CONCENTRATIONS AND SELENIUM UPTAKE BY VEGETATION ON SURFACE COAL MINE LANDS IN WYOMING<sup>1</sup>

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**Abstract:** Selenium (Se) is an important issue to abandoned, as well as active, surface coal mine land reclamation. Overburden material that is brought to the surface during surface coal mining operations may have extractable Se levels greater than 0.1 mg/kg, a level considered 'unsuitable' for reclamation purposes in Wyoming. Surface mining may also affect soil/backfill Se chemistry, which may influence soil-plant Se relationships. The main objective of this ACML sponsored project was to evaluate soil/backfill and plant Se relationships by addressing the following questions: 1) what extraction procedures might be a better indicator of 'soluble' (plant available) soil Se; 2) what forms of Se are present in seleniferous soil and backfill materials, and how are these related to plant uptake of Se; 3) what impacts do chemical, physical and biological soil characteristics have on plant uptake of Se; 4) how does Se content of native and reclaimed plant species vary during a growing season; 5) what effect does soil depth have on plant uptake of Se; 6) what Se suitability limits should be recommended for backfill materials to be topsoiled and revegetated? Sites selected for this project included an abandoned and two active coal mines located in the powder River Basin; the advantage of involving active coal mines is that an extensive soil and backfill Se data base already exists. The relationship between soil/backfill Se levels (determined from four different extraction methods and total Se) and plant Se levels (three different life forms-grass, forb, shrub, and a composite grass) was examined for both native (N) and reclaimed (R) areas. This is an important issue to abandoned and active coal mine lands because it may indicate how overburden materials should be handled in the backfilling and reclamation process. Results of three years of data will be presented in the poster. The information obtained from this study will, in part, be used to better understand conditions that influence plant Se uptake. Additional information determined from this study will be presented in a special symposium entitled "Selenium: Mining, Reclamation, and Environmental impacts" which will be held during the Gillette ASSMR meetings.

**Additional Key Words:** Extractable Se, hot water Se, AB-DTPA Se, phosphate Se, saturated paste Se, soil-plant Se relationships.

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