

Leachate Chemistry of Mixtures of Fly Ash and Alkaline Coal Refuse

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ABSTRACT

The potential water quality effects of bulk-blends of alkaline CCP's with neutral to alkaline coal refuse has not been evaluated. The mobility of a number of oxyanions (e.g. As, Se, and Mo) from CCP's may be enhanced in a high pH leaching environment and pose a potential problem to ground water and receiving streams. The objective of this study was to determine the effects of CCP/alkaline coal refuse mixtures on water quality using leaching columns (15cm in diameter and 75cm in height). The experiment consisted of three ash-mixing rates (0, 10 and 20% by volume) and two leaching environments, saturated vs. unsaturated. Columns were leached with simulated rainfall water (pH 4.8), applied twice a week for a total period of six months. The ash-amended columns generated very high leachate pH values (between pH 8.5 and 11.5) that declined slightly but steadily with time. Leachate levels of As and Se in all leachates were much higher than the primary drinking water MCL and were directly related to ash loading rate. Leachate Mo levels were high initially and responded to ash mixture rates. Saturated leachates were consistently higher in Mo than their unsaturated counterparts, and leachate levels dropped rapidly after several pore volumes of elution to relatively low levels. Leachates coming from columns represent a worst-case scenario of the leaching potential of selected oxyanions. Successful field-scale co-disposal of CCP's with alkaline coal refuse will depend on multiple site-specific factors to ameliorating the high concentration release by the CCP amended alkaline coal refuse.

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