

Environmental Impacts from the North Cave Hills Abandoned Uranium Mines, South Dakota.

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Prospecting and mining of uraniferous lignite in the Tertiary Fort Union formation occurred from 1954 through 1967 in northwestern South Dakota. Activity was centered on US Forest Service land and abandoned mine sites received no reclamation per general mining laws and Public Law 357 from that era. Subsequent erosion and transport of mine waste has resulted in impacts to soil and water resources down gradient of the mine sites. Through US-EPA Region 8 funding, a Joint Venture Agreement between the USDA-Forest Service Northern Region and the South Dakota School of Mines has been established to evaluate environmental impacts from uranium mining to soil, water, and air resources occurring on private lands surrounding the North Cave Hills complex within Custer National Forest. Results from this study indicate historical mining activities have caused degradation of regional ecological and environmental resources through the transport and deposition of sediments and spoils containing As, Cu, Se, Mo, Ra226, Th, U, and V. Surface water concentrations of As, Cu, Mo, U, and V exceeded established background concentrations within approximately 27 km of stream length flowing below abandoned mines. Several sampling sites contained total metal concentrations exceeding 35 times established background. Sediment results show the formation of secondary mineral phases was typically limited to the upper depths of the sediment cores collected. Re-mobilization of contaminants is a significant concern due to seasonal changes to redox and pH environments, especially within several large sediment deposition zones where deposition depths exceeded 10 m. Groundwater quality in the region appears mostly unaffected by mining except for 2 wells completed in shallow alluvial aquifers down-gradient of the mines. Regional deposition of dust originating from mine sites appears to be low and only U shows a correlation to the prevailing wind direction and mine locations.