A New Project - Using Coal Combustion By-products for Feedlot Surface Stabilization

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Livestock producers in North Dakota are seeking a low-cost alternative to placing concrete in feedlots. Earthen pens and lane-ways do not withstand concentrated livestock traffic during extended wet periods such as spring thaw. As the integrity of the pen or lane-way surface breaks down, deep mud and poor drainage reduce animal performance and health, increase odor emissions and prevent regular maintenance operations such as manure removal. Commonly, the soil/manure interface layer is damaged resulting in deeper leaching of nutrients and an increased risk of groundwater pollution.

Sufficient evidence exists to suggest that using Coal Combustion By-products (CCBs) can lead to significant improvements in pen and lane-way conditions. Work performed at the Energy and Environmental Research Center indicates that several lignite coal ashes are suitable for use in feedlot surfacing - either in constructing a concrete-like surface or in stabilizing the existing soils. However, CCB properties vary with the source of the material and the suitability of a specific CCB for feedlot surfacing must be investigated before placement.

A new project to demonstrate the use of North Dakota lignite coal ash for surfacing feedlots will begin in 2000. The criteria evaluated in the demonstration will include engineering and environmental performance as well as the economics of procuring the materials and placement techniques. The plan is to demonstrate up to four different surface types at the NDSU Carrington Research Extension Center Bison Research Facility. It is anticipated that some of the surfaces will have properties similar to concrete for use in the feeding/watering areas. Other surfaces will be designed to provide a "softer," more soil-like surface that provides drainage and support for cleaning equipment. Feed roads will be surfaced with lignite bottom ash. In the second year of the project, two or three livestock producers in other parts of the state will have the opportunity to trial promising CCB treatments.

The participants in this proposed effort are the University of North Dakota Energy & Environmental Research Center, North Dakota State University Carrington Research Extension Center, the NDSU Department of Agricultural & Biosystems Engineering, and several North Dakota utilities and ash marketers.