NATURAL RESOURCES CONSERVATION SERVICE WATERSHED REHABILITATION IN OKLAHOMA A GEOLOGICAL PERSPECTIVE

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Abstract: As floodwater control structures begin to approach the end of their functional life, Natural Resources Conservation Service (NRCS) must determine the best course of action to be taken to prevent potential damage to downstream facilities, such as mobile homes, church camps, and suburban residential areas, many of which have been built during the past few decades and since construction of the dams. NRCS continues to work with local communities to identify and rehabilitate dams that could become a threat to public health and safety. Rehabilitation will not only ensure that these flood control dams remain safe, but that they will continue to provide flood control, recreation and wildlife habitat for the next 50 to 100 years. It is the responsibility of the NRCS geologist in Oklahoma to provide the geological expertise to help ensure that these structures have adequate storage, foundations and appurtenances to function properly for the life of the structure.

Some geologic considerations that must be taken into account are:

1. Soluble geologic materials within the embankment, such as gypsum or anhydrite, which may contribute to dissolution and lead to seepage and/or structural failure.
2. Soils within secured easement areas adjacent to the existing structure or within the existing sediment pool must provide suitable borrow material and occur in adequate quantity for modification of the dam.
3. In cases where the auxiliary spillway must be widened to accommodate new discharge volumes, materials occurring there must be properly characterized to allow for a proper design.
4. Materials in the existing embankment foundation must be competent to withstand increased volumes of water should the dam height be raised to increase storage.
5. In cases where decommissioning is a viable option, effects on downstream facilities must be taken into consideration.
6. Dispersive and low plasticity soils and geologic materials, highly faulted geologic formations within the area, and karst features are just some of the geologic hazards that might have a significant impact on planning, design, and construction of dams.

A team of planning engineers, design and project engineers, surveyors, local field office and conservation district personnel must provide suitable alternatives for modification of these structures. As all parties work together, it is possible to achieve the desired effect: a safe and functional dam that will serve the local community for years to come.