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Evaluation of Erosion and Sediment Control Practices for Construction Activities Using RUSLE2

Recently, the EPA exempted oil and gas construction activities from NPDES permitting, leaving state and local agencies responsible for implementing programs to manage storm water runoff from theses activities. Because over 30,000 new oil and gas well sites are constructed throughout the United States each year, it is important to understanding the potential storm water impacts from these sites as well as how these impacts can be minimized through effective construction site management. Version 2 of the Revised Universal Soil Loss Equation (RUSLE2) was used in this study to estimate sediment yield and assess the relative effects of erosion and sediment controls at natural gas well construction sites in North Central Texas. Because the model was designed to be land use independent, it is applicable to many land use conditions, including commercial and residential construction sites. The main advantage of RUSLE2 over other erosion models is its ability to assess the relative effectiveness of various best management practices (BMPs), including seeding, mulching, erosion blankets, silt fences, filter strips, and sediment basins. RUSLE2 was used to evaluate these BMPs for a combination of three gas well site slope conditions and three different soil types (K-values ranging from 0.17 to 0.43). While modeled annual average sediment yields ranged from 5 to 60 tons per acre when the sites were unprotected, reductions in sediment yield resulting from the BMPs ranged from 50 to 92%. A comparison of efficiency values for the various slope/soil type combinations revealed that both slope and soil type effected the efficiencies of the BMPs. Specifically, this research demonstrates a useful approach for managing soil loss and understanding the importance of selecting appropriate site-specific BMPs for natural gas well construction sites. However, this approach is also applicable to any type of construction activity that can be represented by the model.

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