Technical Reclamation Memorandum

TRM # 17

Kentucky Department for Surface Mining Reclamation and Enforcement

Use of SEDIMOT II for Steep Slopes

Individuals using the University of Kentucky version of SEDIMOT II to design sediment ponds for watersheds with steep slopes can obtain a lower sediment load by inputting the sine of the slope angle converted to percent rather than the percent slope (see "Applied Hydrology and Sedimentology for Disturbed Areas," p. 333, Eq. 5.10; and "Design Manual for the SEDIMOT II Hydrology and Sedimentology Model," pp. 1.7.1 and 1.7.2, Eqs. 7.2 and 7.6). Use of the percent sine slope is applicable to both the MUSLE and SLOSS sediment load routines.

Users may find it convenient to calculate the MUSLE or SLOSS slope variable [PARAS (I,J,3)] by using the equation

$$\text{PARAS } (I,J,3) = \text{Sin}(\text{Tan}^{-1}(S)) \times 100$$

Where PARAS (I,J,3) is the sine of the slope angle converted to percent; S is the conventional fractional slope calculated as the tangent of the slope angle, or calculated by dividing the elevation difference by the associated horizontal distance; and multiplication by 100 converts from a fractional sine slope to a percent sine slope.

Individuals using a version of SEDIMOT II other than that supplied and maintained by the University of Kentucky, Department of Agricultural Engineering should check with the responsible vendor to determine if the above slope correction is applicable.

LS Factor

In calculating the LS factor for the MUSLE sediment load routine, the University of Kentucky version of SEDIMOT II uses a steep slope factor (exponent m; see above cited references) which generates a slightly higher sediment load than that produced by Eq. 5.10 or Figure 5.15 in "Applied Hydrology and Sedimentology for Disturbed Areas." The increase in sediment load is a function of slope length and varies from near zero for slope lengths less than 100 feet to approximately 10 percent for a slope length of 200 feet. Since a given percentage increase in the total sediment load will produce a comparable percentage increase in the arithmetic average settleable solids, the department will approve ponds designed with the University of Kentucky version of SEDIMOT II which have 24-hour arithmetic average settleable solids concentrations of 0.55 ml/l. This slight increase in the

allowable settleable solids concentration from 0.5 ml/1 to 0.55 ml/1 will provide consistency with Eq. 5.10 and Figure 5.15 of "Applied Hydrology and Sedimentology for Disturbed Areas." Other versions of SEDIMOT II which employ Eq. 7.2 as described in the "Design Manual for the SEDIMOT II Hydrology and Sedimentology Model" will be comparably reviewed.

Individuals using a version of SEDIMOT II other than that supplied by the University of Kentucky, Department of Agricultural Engineering should check with the responsible vendor to determine if the above change in the settleable solids limit is applicable.

If you have questions concerning the slope correction or settleable solids limit, please contact Bob Salyers at (502) 564-2320 or Dick Rohlf at (502) 564-2377.