APPENDIX H

SOILS

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H.0 SOILS

H.1 WIND EROSION CALCULATIONS AND ASSUMPTIONS

The equation used to calculate soil loss by wind erosion was the Wind Erosion Prediction Equation (Fuller, 1987). The equation is expressed as:

$$E=(CIVKL)$$

Where E, the predicted soil loss expressed in tons per acre per year, is a function of:

C = Climate
I = Soil erodibility
V = Vegetative production
K = Surface roughness
L = the unsheltered distance across a field.

Assumptions:

1. Current conditions at McGregor Range reflect the soil and vegetative data found in the NRCS MUIR databases for the area.

2. Moderate impact areas consist of 50 percent of the area being undisturbed and having vegetative cover similar to that in the MUIR database. Of the remaining area, 17 percent would have unsheltered distances of 1,000 feet, 17 percent would have unsheltered distances of 100 feet and 16 percent would have unsheltered distances of 10 feet. These unsheltered distances would

reflect disturbances created by staging/tank training areas, roads, and bomb craters, respectively. These disturbances would be denuded of vegetative production.

3. High impact areas would have soil data similar to that reported in the MUIR databases for the McGregor Range area, however, these areas would have no vegetative production.

4. Small grain equivalents were calculated as described in Fuller (1987) for the production amounts in the MUIR database for range sites. Litter amounts were considered to be 20 percent of the total production for the site.

H.2 WATER EROSION CALCULATIONS AND ASSUMPTIONS

The equation used to calculate soil loss by water erosion was the RUSLE, version 1.04) (Soil and Water Conservation Society, 1995). The equation is expressed as:

$$A=RK(LS)CP$$

Where *A*, the predicted soil loss expressed in tons per acre per year, is the product of:

R = climatic erosivity (rainfall and runoff)
K = soil erodibility
L = slope length
S = Slope gradient or steepness
C = soil cover and management
P = erosion-control practice.

Assumptions:

1. The *R* factor variable was estimated for McGregor Range, based on *R* factor isopleth maps from the NRCS and the Soil and Water Conservation Society (1995).

2. Data for the variables *K, S,* and *C* (specifically vegetative production in lbs/acre/year) were taken from the NRCS national MUIR database.

3. The average slope percentage for the soil association was used. The slope length variable (*L*) was assumed to be 50 feet for all soils since this length is usually the maximum length for most rangeland sites.

4. The *P* variable was held at 1 for all soil loss predictions since no erosion-control practices were anticipated.

5. Soil losses were calculated for the top soil horizon only.

6. The three disturbance severity scenarios, no disturbance, moderate impact and maximum impact, were calculated by changing values for vegetative cover, vegetative litter, and surface rock cover or pavement. These inputs were also used for calculation of the *C* variable.

7. These soils were assumed to produce grasslands, since the soil survey production data indicated that the most abundant species were grass species for a large percentage of the soils. The grass cover was assumed to be 35 percent for all soils with a litter cover of 20 percent for the no disturbance scenario.

8. Percent rock cover varied across soils and was based on the percent of the soil that was comprised of rocks greater than 0.25 inches.

9. The moderate impact scenario used 50 percent of the vegetative, litter, and rock cover of the no disturbance scenario.

10. The maximum impact scenario used 0 percent cover values for vegetation, litter, and rock.