

# RUSLE2

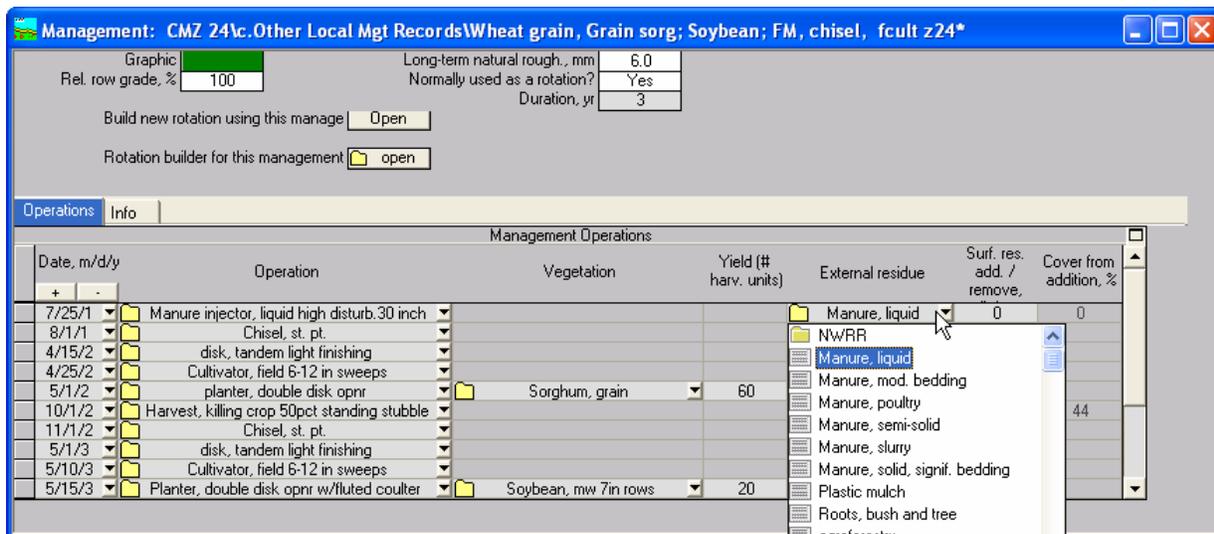
## GUIDELINE FOR MANURE

### Kansas Technical Guide #3

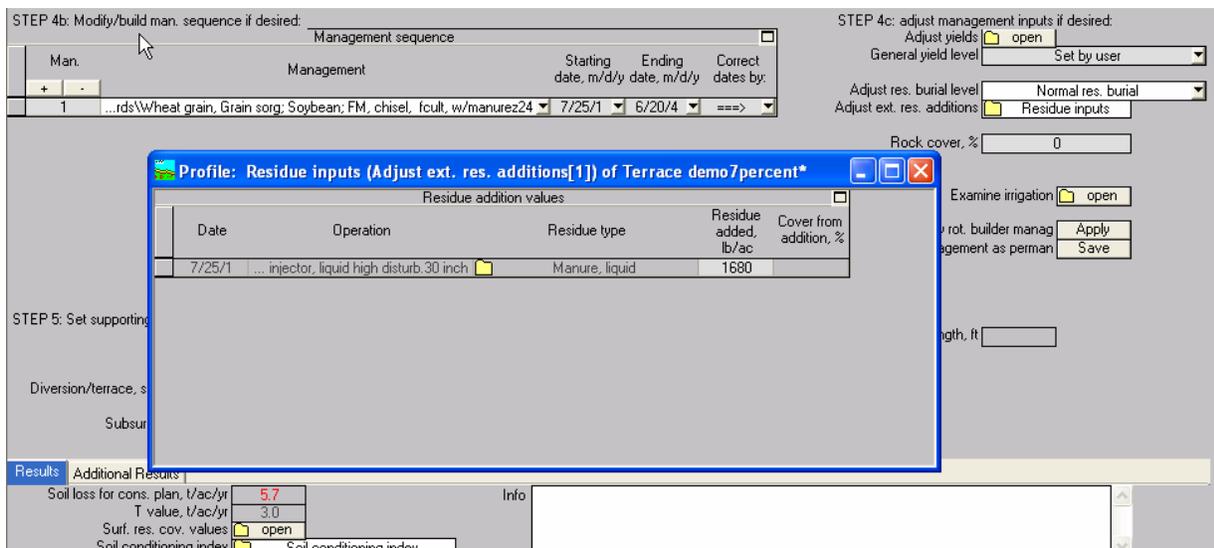
#### Guidelines for Calculating Manure Dry Weight and Effectiveness

#### How to Incorporate Manure into Crop Management File

When manure application is included in the operation, the Crop Management File will need to include the manure operation. When you select the manure operation in Revised Universal Soil Loss Equation, Version 2 (RUSLE2), a dialog box will appear to the right of the operation that requires you to include the type of manure that you are applying.



You will then need to enter the amount of any additional cover in dry weight of the manure in the RUSLE2 profile screen in the box "Adjust external residue additions."



RUSLE2 required that inputs for the amount of manure added to a field be input as mass/ac dry weight. A method to convert the fresh or wet weights of manure to dry weight is shown below.

Laboratory data should be used in lieu of these conversion methods where available. Moisture content estimates are also available in the National Engineering Handbook Series, Part 651, Agricultural Waste Management Field Handbook, for various manure classes.

There are some new RUSLE2 manure residue effectiveness guidelines for **liquid, slurry, semi-solid, and poultry** manure types that only **50 percent** of the dry weight for these wet manure types should be used. Liquid, slurry, semi-solid, and poultry manure types are not as effective in retarding the erosion process as solid manures. RUSLE2 users should enter only half of the dry weight computed for these manure types. Use 100 percent of dry weight calculated for solid manure and solid manure plus bedding.

### **Equations to Convert to Pounds Dry Matter**

#### **(A) For liquids and slurries**

$(\text{gals/ac}) \times (8.34 \text{ lbs/gal}) \times (\% \text{ solids as a decimal}) = \text{lbs dry matter}$

Sample calculations:

$(10,000 \text{ gal/ac}) \times (8.34 \text{ lbs/gal}) \times (0.02) = 1668 \text{ lbs/ac dry matter}$

RUSLE2 Conversion:  $1668 \text{ lbs/ac dry matter} \times 0.5 = 834 \text{ lbs/ac}$

#### **(B) For semi-solids**

$(\text{lbs/ac}) \times (\% \text{ semi-solids as a decimal}) = \text{lbs dry matter}$

Sample calculations:

$(8000 \text{ lbs/ac}) \times (0.15) = 1200 \text{ lbs/ac dry matter}$

RUSLE2 Conversion:  $1200 \text{ lbs/ac dry matter} \times 0.5 = 600 \text{ lbs/ac}$

#### **(C) For solids**

$(\text{lbs/ac}) \times (\% \text{ solids or semi-solids as a decimal}) = \text{lbs dry matter}$

Sample calculation:

$(8000 \text{ lbs/ac}) \times (0.55) = 4400 \text{ lbs/ac dry matter}$

### **Recommendations for Types of Manure in RUSLE2 Database**

“Manure, liquid” (swine from confinement, holding ponds, and municipal sewage):

- Use Equation A, “Manure, semi-solids” (includes beef, swine, and dairy settling basin)
- Use Equation B “Manure, open lots” (beef, swine, dairy manure from open lots and buildings, and poultry manure)
- Use Equation C, solids “Manure, with bedding” (horse, sheep packs including straw, and shredded newspaper)

**Summary of % Moisture Content Manure  
Agricultural Waste Management Field Handbook  
(National Engineering Handbook Series, Part 651)**

<b>Species %</b>	<b>Moisture Content</b>	<b>Solid %</b>
<b><u>Dairy</u></b>		
Milk house	99.7%	0.3%
Milk house + Parlor	99.4%	0.6%
Milk house + Parlor + Holding area	99.7%	0.3%
Anaerobic lagoon – Sludge	90.0%	10.0%
Anaerobic lagoon – Supernatant	99.75%	0.25%
Aerobic lagoon – Supernatant	99.95%	0.05%
<b><u>Beef</u></b>		
Un-surfaced lot	45.0%	55.0%
Surfaced lot - High forage	53.3%	46.7%
Surfaced lot – High energy	52.1%	47.9%
Feedlot runoff pond – Sludge	82.8%	17.2%
Feedlot runoff pond – Supernatant	99.7%	0.3%
<b><u>Swine</u></b>		
Storage tank under slats:		
Farrow	96.5%	3.5%
Nursery	96.0%	3.0%
Grow/finish	91.0%	9.0%
Breeding/gestation	97.0%	3.0%
Anaerobic lagoon – Supernatant	99.75%	0.25%
Anaerobic lagoon – Sludge	92.4%	7.6%
Feedlot runoff water	98.5%	1.5%
Feedlot settling basin sludge	88.8%	11.2%
<b><u>Poultry</u></b>		
Litter:		
Layer high-rise	50.0%	50.0%
Broiler	24.0%	76.0%
Turkey	34.0%	66.0%
Broiler breeder	34.0%	66.0%
Duck	11.2%	88.8%
Anaerobic lagoon:		
Layer – Supernatant	99.5%	0.5%
Layer – Sludge	86.9%	13.1%
Pullet – Supernatant	99.7%	0.3%
Pullet – Sludge	92.6%	7.4%
<b><u>Veal</u></b> as excreted	97.5%	2.5%
<b><u>Sheep</u></b> as excreted	75.0%	25.0%
<b><u>Horse</u></b> as excreted	78.0%	22.0%