Beef Feedlot Liquid Waste Utilization Plan

For:		**Date:**	
Office:		**Field:**	
Assisted by:			

Step 1 **Resource Inventory**

____ = acre-feet in retention structure at time of evacuation
____ = nitrogen content (lb/1000 gallons)
____ = ammmonia content (lb/1000 gallons)
____ = phosphorus content (lb/1000 gallons)
____ = potassium content (lb/1000 gallons)

Steps 2 - 3d are used to approximate total nutrients in liquid component

Step 2 **Total Liquid Produced**

Step 2a Total Gallons from Step 1
Total Gallons = (acre-feet x 325,851 gallons per acre-foot)
Total Gallons = ____ ____ gallons

Step 2b Total Acre-Inches from Step 1 = (acre-feet x 12 acre-inches per acre-foot)
Total Acre-Inches = ____ ____ ac-inches

Step 3 **Total Nutrients in Liquid Component**

Step 3a Total Nitrogen in Liquid Component = (Total Gallons x lb of N per 1000 gallons)/1,000 Gallons
Total Nitrogen = ____ ____ lbs.

Step 3b Total Ammonia in Liquid Component = (Total Gallons x lb of NH_4 per 1000 gallons)/1,000 Gallons
Total Ammonia = ____ ____ lbs.

Step 3c Total Phosphorus in Liquid Component = (Total Gallons x lb of P per 1000 gallons)/1,000 Gallons
Total Phosphorus = ____ ____ lbs.

Step 3d Total Potassium in Liquid Component = (Total Gallons x lb of K per 1000 gallons)/1,000 Gallons
Total Potassium = ____ ____ lbs.

Step 3e Total Nutrients in Liquid Component from Steps 3a-3d
Total Nitrogen = ____ ____ lbs.
Total Ammonia = ____ ____ lbs.
Total Phosphorus = ____ ____ lbs.
Total Potassium = ____ ____ lbs.

Step 4 **Plant Available Nutrients (availability after mineralization)**

Step 4a Plant Available Nutrients After Mineralization

Assumes that half of the Nitrogen is nitrate - nitrogen, which is 100% available.
The other half of the Nitrogen is organic, of which 45% is available the first year.

NO_3 - N = Total N lbs. x 0.5 x 100% =			lbs.
Organic - N = Total N lbs. x 0.5 x 45% =			lbs.
Ammonia - N = Ammonia N lbs. x 100% =			lbs.
Phosphorus = Phosphorus x 90% =			lbs.
Potassium = Potassium x 95% =			lbs.

Step 4b Total Available Plant Nutrients

Total Available Nitrogen =			lbs.
Total Available Phosphorus =			lbs.
Total Available Potassium =			lbs.

Step 4c Total Available Plant Nutrients per 1,000 Gallons

Total Available Plant Nutrients per 1,000 Gallons = (from step 1 and availability values from step 4a)

Total Avaliable Nitrogen =			lbs./1,000 gallons
Total Available Phosphorus (as P_20_5) =			lbs./1,000 gallons
Total Available Potassium (as K_20) =			lbs./1,000 gallons

Step 4c automatically converts P and K to the oxidized forms. If using the spreadsheet manually, then convert using: P_20_5 = P x 2.29 K_20 = K x 1.21

Step 5 **Nutrients Required By Crop**

Step 5a **Crop Inventory Information**

Crop	Realistic Yield Goal	Acres

Step 5b **Soil Test Information**

PPM $N0_3$-N	PPM - P_2O_5	PPM - K_2O	% OM

Step 5c **Crop Nutrient Requirements**

Crop	Nutrient	Requirement (lb./ac)
	Nitrogen	
	P_2O_5	
	K_2O	

Step 6 **Crop Nitrogen Requirement After Nitrogen Credit from Irrigation Water**

2.7 x PPM NO_3^- x net acre-feet water applied = lbs. N/acre (insure conversion of acre-inches to acre-ft)

	=ppm NO_3-
	=total net inches water applied

lbs. N/Acre =		lbs./ac		lbs./ac.
Adjusted Crop #1 Nitrogen Req.=		lbs./ton		lbs./ac.

(Crop #1 Nitrogen Requirement (from step 5c) - N from irrigation water)

Step 7 **Crop Nitrogen Requirement After Nitrogen Credit from Previous Legume**

lbs. N/Acre fixed =		lbs./ac		lbs./ac
Adjusted Crop #1 Nitrogen Req.=		lbs./ton		lbs./ac

(Crop #1 Nitrogen Requirement (from step 5c) - N from legume fixation

Step 8 **Calculate Nitrogen-based Liquid Application Rates**

(from step 6)	Crop Nitrogen Needs =		lbs./ac		lbs./ac.
(from step 4c)	Available N in Liquid =		lbs./1000 gallons		lbs./1000 gallons

N-based Application Rate (1,000 gallons/ac) = Crop N Needs (lbs/ac) x Available N (1000 gallons/lb.) =

	1000 gallons/acre		1000 gallons/ac

N-based Application Rate (ac-inches/ac) = Nitrogen-based Application Rate/325,851 x 12 =

	ac-inches/ac

If these application rates exceed the Available Water Holding Capacity of the soil at the time of application, the soil AWHC becomes the limiting factor, and is used to determine the liquid application rate. Assume that only one-half of the total AWHC is ever available.

Step 9 **Calculate Phosphorus-based Liquid Application Rates**

(from step 6)	Crop Phosphorus Needs =		lbs./ac		lbs./ac.
(from step 4c)	Available P_2O_5 in Liquid =		lbs./1000 gallons		lbs./1000 gallons

P_2O_5-based Aplication Rate (1,000 gallons/ac) = Crop P_20_5 needs (lbs/ac) x Available P_20_5 (1000gallons/lb.) =

	1000 gallons/acre		1000 gallons/ac

P_20_5-based Application Rate (ac-inches/ac) = Nitrogen-based Application Rate/325,851 x 12 =

	ac-inches/ac

If these application rates exceed the Available Water Holding Capacity of the soil at the time of application, the soil AWHC becomes the limiting factor, and is used to determine the liquid application rate. Assume that only one-half of the total AWHC is ever available.

Step 10 **Calculate Potassium-based Liquid Application Rates**

(from step 6) Crop Potassium Needs = | lbs./ac | lbs./ac.

(from step 4c) Available K_20 in Liquid = | lbs./1000 gallons | lbs./1000 gallons

K_2O-based Aplication Rate (1,000 gallons/ac) = Crop K_20_5 needs (lbs/ac) x Available K_20 (1000gallons/lb.) =

1000 gallons/acre | 1000 gallons/ac

K_20-based Application Rate (ac-inches/ac) = Potassium-based Application Rate/325,851 x 12 =

ac-inches/ac

If these application rates exceed the Available Water Holding Capacity of the soil at the time of application, the soil AWHC becomes the limiting factor, and is used to determine the liquid application rate.
Assume that only one-half of the total AWHC is ever available.

Step 11 **Calculate Approximate Acres of Crop Needed**

Total Liquid Produced (from Step 2) (Ac-In.)/Application Rate (from Step 8, 9, and 10)

Nitrogen-based = Ac-In Liquid (Step 2)/N-based App. Rate (Step 8) = | acres

Phosphorous-based = Ac-In Liquid (Step 2)/P-based App. Rate (Step 9) = | acres

Potassium-based = Ac-In Liquid (Step 2)/K-based App. Rate (Step 10) = | acres

Nitrogen-based = | acres

Phosphorous-based= | acres

Potassium-based = | acres

NOTE!!!

Step 12 **Recommended Timing of Application**

Step 13 **Operation and Maintenance**

Step 14 **Additional Specification and Notes**

I have reviewed the attached Waste Utilization Plan, and agree to apply as specified:

Producer Signature ____

Date ________________