

**BEST MANAGEMENT PRACTICES FOR REUSE OF COTTON GIN TRASH**

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**Cotton Gin Trash BMP Committee**

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**Application**

(Date)

Mr. Brad Spicer

Assistant Commissioner  
Louisiana Department of Agriculture and Forestry  
Post Office Box 631  
Baton Rouge, Louisiana 70821-0631

Dear Mr. Spicer:

This letter is to notify you of the desire of Cotton Gin located in , Louisiana to participate in the Agricultural Waste Best Management Plan program. We are enclosing our plan for the disposal of our waste in an environmentally sound manner.

Thank you for your assistance in this matter.

Sincerely,

Title

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## WASTE MANAGEMENT PLAN

Cotton Gin:

Address:

City/State:

Zip Code:

Telephone m :

FAX m :

Contact Person:

Disposal methods to be utilized:	
1. Personal use by individuals (10 tons/individual/site exempt under LAC 33: VII.303.H)	% of waste used
2. Land application	% of waste used
3. Animal feed	% of waste used
4. Composted	% of waste used
5 Other: Specify	% of waste used
Collection and transportation of the cotton gin trash/gin trash compost will be in accordance with approved BMP guidelines. Trash will/will not be stored outside before it is used. If outside storage is used, approved storage BMP guidance will be followed to prevent any contamination of surface waters.	

Land application of cotton gin trash/compost will be made on land owned by:	
Landowner:	
Address:	
City/State:	Zip Code:
Additional Landowner:	
Additional Landowner:	
The estimated amount of waste to be produced is tons based on last years gin volume [(# Bales Ginned X 150 lbs) ÷ 2000 = # Tons/Year]. At the suggested application rate of 10 tons per acre of raw cotton gin trash for cotton a maximum of acres will be needed for land application.	

### COTTON GIN TRASH VOLUME ESTIMATE CALCULATIONS

**Gin Name:**

**Location:**

1. m of Bales ginned last year .
  2. m of Bales X .8 = cubic yards of cotton gin trash.
  3. m of Bales X 150 = lbs of cotton gin trash.
- Lbs of cotton gin trash ÷ 2000 = tons of cotton gin trash.

### COTTON GIN TRASH APPLICATION RATE CALCULATION

1. Crop nitrogen requirement lbs/A.
2. Nitrogen content of cotton gin trash/compost %.
3. Convert %N to lbs N/ton gin trash by multiplying % by 20.
4. Multiply lbs per ton ( ) by 0.3 to get estimate nitrogen available.  
lbs/ton x 0.3 = lbs/ton
5. Calculate application rate by dividing crop nitrogen requirement by lbs available per ton gin trash.  
(1) ÷ (5) = tons gin trash per acre application rate.

### LANDOWNER AGREEMENT

This is to certify has agreed to gin applying cotton gin trash to acres of land owned by him in Parish. It is understood and agreed the gin will apply the cotton gin trash at environmentally sound rate.

## **Landowner Gin Representative**

### **PLAN OF DISPOSAL**

#### **Example A**

Cotton gin trash (CGT) will be collected from a hopper at the gin into a side dump trailer and taken to the selected fields. At the site it will be dumped into rows 200 feet apart. The rowed material will be spread over the land with a blade and a spring harrow. After spreading is complete the CGT will be plowed into the soil. This land has been planed to a 1% grade and 50 feet set backs from down slope edges will be observed.

#### **Example B**

Cotton gin trash (CGT) will be augured into a storage pile adjacent to the gin until spring. In the spring the CGT will be loaded onto trucks and taken to the field. In the field the material will be spread using manure spreader. A 50 feet set back will be used all around the field. The material will be incorporated with normal seed bed preparation.

#### **Example C**

The fresh cotton gin trash (CGT) will be collected into a covered pile adjacent to the gin. The CGT will be loaded into a modified cotton trailer and taken to selected fields. At the field the material will be loaded into a CGT application wagon and applied to the field. After application a cover crop will be over seeded on the field. A 100 foot down slope set back will be used and rye grass seeded into the set back area.

#### **Example D**

The fresh cotton gin trash (CGT) will be collected into a hopper at the gin and dumped daily into a CGT application trailer. The loaded trailer will be taken to the field and the material applied to the land. After application the material will be incorporated. The land has been land planed and a 50 foot down slope set back will be observed.

#### **Example E**

The fresh cotton gin trash (CGT) will be collected into a side dump trailer at the gin. When full the trailer will be taken to the storage compost site, dumped into windrows and water applied until a 60% moisture level is reached. Temperatures will be monitored and the windrows will be turned weekly after the temperatures reach 140°F. The windrows will be turned weekly until temperatures do not exceed 100°F. Moisture will be kept at 50-60% in the windrows by adding water as necessary. Run off from the compost area will be collected and used to keep the composting material moist. When the compost is mature it will be stored in piles until used. The compost will be applied to the fields in the spring just prior to seed bed preparation using CGT trailer.

## AGRICULTURAL PROCESSING WASTE MANAGEMENT CERTIFICATION LETTER

**Name and Address of Processor:**                      **Name and Address of Transferee:**

I, \_\_\_\_\_, the transferee, agree that all agriculture waste (raw and compost) I remove from this site will be handled and applied in accordance with accepted and approved best management practices, and that all applicable state and federal regulations will be followed in the transportation, storage and land application of these materials.

I will follow the attached "Land Application Guidelines" when applying waste to the land as a soil amendment.

*Signature of Transferee (Date)*

### LAND APPLICATION GUIDELINES

**Cotton gin trash/gin trash compost will not be applied:**

- 1) At rates exceeding recommended maximum yearly application rates.
- 2) Within 100 feet of a stream or waterbody where slopes are 8 percent or greater. Application can be made within 50 feet of a stream or waterbody where slopes are less than 8 percent providing a well-established buffer exists between the application site and the water's edge.
- 3) On actively eroding land areas
- 4) Will not be applied on soils subject to frequent flooding or overflow.
- 5) Within 100 feet of water wells.
- 6) When wind direction and velocity would cause odors or dust to drift towards residences, public areas or roads.

### REQUIREMENTS:

- 1) Have waste analyzed to accurately determine application rates.
- 2) Have soil tested at each site where waste is to be applied to determine soil loading rates.
- 3) Know crop to be grown.
- 4) Apply during seasons when vegetation is actively growing at the site, during seed bed preparation or as a mulch.
- 5) Calibrate spreading equipment.
- 6) Keep compost dry.

MAXIMUM YEARLY COTTON GIN TRASH APPLICATION RATES (Tons/Acre)						
CROP	Nitrogen Uptake Lbs/Acre	Raw Gin Trash <sup>1</sup>		Gin Trash Compost <sup>2</sup>		
		Surface <sup>3</sup> Application	Incorporated Tons/Acre	Surface <sup>3</sup> Application	Incorporate d	
Improved Bermuda	200	47	29	14	9	
	300	73	44	22	13	
Hay (4-10 t)	400	97	58	28	18	
	500	122	73	37	22	
Corn (180 bu)	200	47	29	14	9	
Corn Silage (32 t)	200	47	29	14	9	
Cotton (lint 1500 lbs)	90	21	13	6.5	4	
Grain Sorghum (4 t)	125	30	18	9	6	
Warm Season Annual Grass	160	39	23	12	7	
Warm Season Perennial Pasture	160	39	23	12	7	
Cool Season Perennial Pasture	160	39	23	12	7	
Rye Grass	200	47	29	14	9	
Small Grain (Grain only)	90	21	13	6.5	4	
Small Grain (Grain and Grazing)	200	47	29	14	9	
Soybeans	225	53	33	16	10	

<sup>1</sup> Computations based on 30% availability of nitrogen the first year and a nitrogen content of 1.14%.

<sup>2</sup> Computations based on 50% availability of nitrogen the first year and a nitrogen content of 2.19%.

<sup>3</sup> Assumes 40% loss of nitrogen due to volatilization.

## COLLECTION AND TRANSPORT OF COTTON GIN TRASH

### *Planning Considerations*

1. Effects on an on-site and roadside water.
2. Effects on surface and groundwater quality.
3. Effects on roadside appearance.
4. Effects on local air quality.

## **COLLECTION AND TRANSPORT OF COTTON GIN TRASH**

### **Definition**

Collection of cotton gin trash resulting from ginning machine picked cotton and transportation to sites for storage, composting or other beneficial use.

### **Purpose**

To promote the beneficial reuse of cotton gin trash as a feed, compost feedstock, soil amendament or surface mulch by use of environmentally safe collection and transportation methods.

### **Conditions Where Practice Applies**

At or near cotton gins and between gins and composting/beneficial use sites.

### **Specifications Guide**

Building or hopper volume required for inside collection, area required for outside collection, method of insuring protection of surface waters, preventing odors and windblown nuisance problems.

## **PLANS AND SPECIFICATIONS**

### **COLLECTION**

#### **Inside Collection:**

##### *Building:*

Gin trash storage inside a closed building may be used if the material is accumulated for further processing such as grinding and pelleting. Storage under-roof or in a closed sided building may be desirable if rainy conditions often prevent manual hauling and spreading operations for several days. The discharge into the building by a pneumatic handling system must be through a cyclone. Conveying equipment such as augers or front-end loaders are necessary for spreading and piling the material inside the building. Caution should be used to prevent the build up of high levels of dust in the air.

#### **Outside Collection:**

##### *Hopper:*

Enclosed Hoppers can be used as temporary storage for gin trash. A cyclone mounted over the center of the hopper is necessary. The hopper size should be large enough to allow the transport and/or spreading equipment to unload and/or spread during daylight hours. The size of the trash hopper should hold 1/3 to 1/2 of the trash generated each day. A good site location for the trash hopper must include good road access and should be removed from nearby businesses or residences. A

2800 cubic foot, bottom dumping hopper with a center mounted cyclone will hold trash from approximately 100 bales of picker harvested cotton.

*Direct Discharge to Transport Vehicle:*

- A.** A properly sized cyclone may be used to load trash directly to transport vehicles. The discharge of the cyclone should be fitted with a canvas boot to minimize wind blown particles.
- B.** A closed inclined screw conveyer to pick up the trash as it is discharged from augers under the gin cyclone system may be used. The inclined conveyer would discharge into the transport vehicle.

*Discharge to Storage Pile:*

The gin trash may be moved to a storage pile by air or by screw conveyer. Generally air is used to pick up trash from the gin's cyclone system. A cyclone can be installed to collect the trash and discharge to the trash pile. An open auger can be used to extend the trash pile away from the cyclone drop point. For long term storage; composting is enhanced and fire problems reduced by the addition of a water sprinkler system to an outside storage pile. This will also reduce dust and windblown material in the vicinity of the gin storage area.

## **TRANSPORTATION**

The material should be loaded into a truck or trailer with sides and top covers to prevent it from blowing onto the highway right away. Wet material should not be allowed to leak onto the highway.

## **STORAGE OF COTTON GIN TRASH**

### **Planning considerations for water quantity and quality**

*Quantity*

1. Effects on water budget, especially on volumes and rates of runoff, infiltration, evaporation, transpiration, deep percolation, on-farm uses and general water recharge.
2. Variability of effects from seasonal or weather variations.
3. Effects on soil moisture.

*Quality*

1. Effects of use and management of nutrients and pesticides on surface and groundwater quality.
2. Effects on visual quality of on-site and of downstream water.
3. Sediment-attached and construction related effects on the quality of downstream waters courses and improvements.

## **STORAGE OF COTTON GIN TRASH**

**Definition:** Outdoor storage of solid organic residues resulting from the processing of fiber from raw materials until they can be utilized.

**Purpose:** To promote the reuse of organic residues from agriculture processing as fuel, bio-mass, soil amendants or other beneficial uses by creating environmentally safe storage facilities.

**Conditions where practice applies:** At or near agricultural processing facilities that generate quantities of organic residues as a result of operations.

**Specification guide:** Area needed for volume of waste, methods of insuring protection of surface waters, and groundwater, operational plans to reduce nuisance problems from wind erosion or odors during storage.

## **PLANS AND SPECIFICATIONS**

**Site:** The site should be convenient to the processing plant to facilitate movement of the material. The site should not be located in or adjacent to a residential area. This will minimize the occurrence of complaints for noise, dust, wind blown material or odor.

The site should be nearly level, with only a slight slope to facilitate drainage to one area on the site. The soil should be of low permeability to reduce the possibility of leachate penetrating to a usable aquifer. If the storage site is to be used during wet weather and heavy equipment is to be used on site, some surface improvement should be used in main traffic areas.

An area to collect run-off and/or leachate must be provided on or adjacent to the site to protect surface water from run-off and/or leachate. The water collected may be reapplied to the residue to reduce wind erosion or disposed of in an environmentally acceptable

manner. A perimeter berm should be established to prevent water draining from the site or from running onto the site. The berm should be able to contain the water from a 25 year, 24 hour rainfall event. The site should not be located in an area prone to flooding or inundation.

The site should be large enough to handle the residue being stored there and still have room for trucks and equipment to enter and/or work. A windrow pile 5x14 feet contains 1.7 cubic yards per linear foot, where a 11x25 feet windrow contains 5.7 cubic yards per linear foot. Table 1 shows some typical weight and volume relationships and estimates on rate of production of some agricultural processing residues.

**Equipment:** On site equipment should be sized to the volume of material being stored. Trucks or trailers will be needed to move material to and from the storage area. Equipment will be needed to move material into piles and load trucks, trailers or conveyors.

A sprinkler system may be used to hold down dust and reduce wind erosion. This system may be fixed or portable. Runoff can be used in the sprinkler system if a pump is available to circulate the water from the collection area.

**Water Treatment/Disposal:** Water collected from leachate/runoff can be reused in a sprinkler system, used to irrigate nearby farm land, allowed to percolate into the surface layers of the soil or treated (if necessary) and discharged. Treatment may be accomplished by a regulated flow over a grassed filter strip below the containment area.

**Operation:** Crop processing residue should be brought to the storage area as soon as possible after separation from the crop to reduce moisture loading and the possibility of contamination. The material should be placed in regular piles as high as manageable, working from rear to front of the storage area. In a large storage area access should be available to all parts of the area. A plan should be made as to what is to be done in case of emergencies such as accidents, fires or flooding. Accidental fires should be put out quickly as possible by smothering or digging out the burning material. This plan should be familiar to all connected to the operation and each should know their responsibilities.

Material should be monitored at the storage area to prevent contamination from outside sources and to prevent complaints from dust or odors. A retrieval or use plan should be developed. If the material is more manageable or desirable after aging a rear access to the older material should be available.

**Table 1:** Volume per ton of agricultural processing residues with estimated amount of residue produced by unit of product.

WASTE PRODUCTION PER PROCESS UNIT					
Product	Lbs/Ft <sup>3</sup>	Vol/Ton	Process Unit	Lbs Waste/Unit	Volume/Unit
Bagasse	10	7.4 yd <sup>3</sup>	Ton	600	2.22 yd <sup>3</sup>
Filter Press			Ton	85	
Ash					
Rice Hulls	18.5	9 yd <sup>3</sup>	Barrel	32.4	1.75 ft <sup>3</sup>
Cotton Gin Trash	7	10.58 yd <sup>3</sup>	Bale	150	.8 yd <sup>3</sup>
Wood Ash					
Sawdust					
Bark					
Potato Peels					

## LAND APPLICATION OF COTTON GIN TRASH/GIN TRASH COMPOST

### Planning considerations for water quantity and quality

#### *Quantity:*

1. Effects on the water budget, especially on volumes and rates of runoff, infiltration, evaporation, transpiration, deep percolation, on farm uses and groundwater recharge.
2. Variability of effects often seasonal and subject to weather variations.
3. Effects of vegetation on soil moisture.
4. Effects of increasing organic matter on water holding capacity of the soil.
5. Potential for a change in plant growth and transpiration because of changes in the volume of soil water.

#### *Quality:*

1. Effects of both growing and decaying vegetation on nutrient balance in the root zone.
2. Effects on erosion and the movement of sediment, nutrients, organic material, and soluble and sediment-attached substances carried by runoff.
3. Effects of use and management of nutrients and pesticides on surface and groundwater quality.
4. Effects on the visual quality of on site and downstream water.
5. Sediment-attached and related effects on the quality of onsite, and downstream water courses and impoundments.
6. Effects on the movement of dissolved substances below the root zone and toward groundwater, especially for on-farm water supply for human and livestock consumption.
7. Effect on wetlands and water-related wildlife habitats.

## LAND APPLICATION OF COTTON GIN TRASH/GIN TRASH COMPOST

**Definition:** A planned system in which all necessary components are installed for managing liquid and solid waste, including runoff from concentrated waste areas, in a manner that does not degrade air, soil or water resources.

**Purpose:** To manage waste in a manner that prevents or minimizes degradation of air, soil and water resources and protects public health and safety. Such systems are planned to preclude discharge of pollutants to surface or groundwater and to recycle waste through soil and plants to the fullest extent practicable.

**Conditions where practice applies:** This practice applies where waste is generated by agricultural production or processing.

**Specification guide:** Nutrient content, crop nutrient requirement, are required for application and methods to protect surface waters.

## **PLANS AND SPECIFICATIONS:**

### **Basic Consideration:**

Determine nutrient content of residue. Determine crop to be planted on site next growing season and nutrient requirement of crop. Calculate application rate not to exceed the nutrients required for crop production as specified for each crop.

Surface applications may be made to minimum tillage or conventional tillage fields to reduce soil loss during the non-crop season. If the application is to be incorporated into the soil prior to planting the next crop, then the application rate should be calculated for incorporation. Conservation tillage system application rates may be calculated differently and should take any off-season cover crop into consideration.

### **Application Rate:**

The application rate should be calculated from a nutrient analysis of the material to be applied, as cotton gin trash and its compost can vary in nutrient content. The crop to be grown the next season and the soil type will determine the amount of nutrient required. Surface applications may be heavier than those to be incorporated into the soil. Applications that will be incorporated in the spring may be made heavier than applications that will be immediately incorporated. Applications of raw cotton gin trash may be made at higher rates than applications of gin trash compost.

Analytical data from 24 gin trash samples from Louisiana taken in 1991 show an average content of 1.39% total nitrogen, .22% total phosphorous and 1.03% total potassium (Table 1). In cotton production, nitrogen will limit the application rate. At 1.39% concentration there is 27.8 pounds/ton of nitrogen in gin trash. Since the nitrogen is in an organic form not all will be available the first year. A estimate of 30% availability of nitrogen the first year may be safe to use to determine the application rate. Heavier soils can take higher application rates than lighter soils.

Gin trash compost may have twice the nitrogen content that the source material had prior to composting. Total nitrogen content of mature composted gin trash from Louisiana in 1992/93 averaged 2.2% or 44 pounds per wet ton compared to 1.14% in the raw gin trash (Table 2). The gin trash volume decreased 62% after 90 days of composting. The availability of nutrients to crops the first year after application may be 50%.

Table 4 shows sample application rates for cotton gin trash and gin trash compost to several crops. Both surface and incorporated application rates are shown. These rates are calculated on the nitrogen rates shown and material from other sources may vary somewhat.

### **Run Off Considerations:**

Run off should be directed over a grassed buffer strip.

Applications of cotton gin trash/gin trash compost made to fields and immediately plowed under should be made at the calculated application rate. Grassed runoff strips or other sediment control measures should be used to prevent gin trash from reaching adjacent streams.

**Table 2:** Concentration of Basic Nutrients in Raw Cotton Gin Trash. Samples Taken from Gins During 1991 Season.

Nutrient	Average Concentration <sup>1</sup>		Range (%)
	(%)	Lbs/Ton	
Nitrogen (TKN)	1.39	27.8	0.64 - 2.23
Phosphorus	0.22	4.4	0.093 - 0.323
Potassium	1.03	20.58	0.176 - 1.58

<sup>1</sup> Averages of samples taken from twenty-four (24) gins during 1991 season.

**Table 3:** Concentration of Basic Nutrients in Cotton Gin Trash Compost. <sup>1</sup>

COTTON GIN TRASH COMPOST				
Nutrient	1,991		1992 <sup>2</sup>	
	Concentration (%)	Lbs/Ton	Concentration (%)	Lbs/Ton
Nitrogen (TKN)	1.52	30.4	2.18	43.66
Potassium (K)	0.1	2.08	0.2	3.94
Phosphorus (P)	0.32	6.32	0.56	11.24

<sup>1</sup> Concentrations of nutrients as % of wet weight.

<sup>2</sup> Average moisture in 1992 samples 63%.

**Table 4:** Sample Application Rates of Cotton Gin Trash and Gin Trash Compost for Selected Crops Using Surface or Incorporated Applications.

COTTON GIN TRASH (TONS PER ACRE)		
CROP/Nitrogen Requirement	Raw Gin Trash <sup>1</sup> (Incorporated)	Raw Gin Trash <sup>1</sup> (Surface) <sup>3</sup>
Cotton 90 lb/A	10.8	18
Corn 200 lb/A	24	40
Soybeans 225 lb/A	27	45
<b>Average N Content - 1.14%</b>		
CROP/Nitrogen Requirement	Composted Gin Trash <sup>2</sup> (Incorporated)	Composted Gin Trash <sup>2</sup> (Surface) <sup>3</sup>
Cotton 90 lb/A	5	8
Corn 200 lb/A	11	18
Soybeans 225 lb/A	12	20

<sup>1</sup> Application rate based on assumed (8.34 lb available N per ton of raw gin trash) availability of nitrogen the first year.

<sup>2</sup> Application rate based on assumed (18.6 lb available N per ton composted gin trash) 50% availability of nitrogen the first year.

<sup>3</sup> Assumes (5 lb available N per ton row gin trash surface applied and 11.16 lb available N per ton composted gin trash surface applied) 40% loss of nitrogen due to volatilization.

## COMPOSTING COTTON GIN TRASH

**Definition:** Collection, storage and composting cotton gin trash (CGT).

**Purpose:** To prepare a material easier to handle with more accessible nutrients for field use.

**Conditions Where Practice Applies:** Where a supply of CGT material is generated that is more acceptable for use as a composted CGT.

### Plans and Specifications

*Site:* The site should be well drained, located on low permeability soil and convenient to the gin. Some surface improvement may be needed to allow work during rainy weather. A water collection storage is necessary and the site should drain to this area to collect runoff. Run-on into the area should be prevented. The site standards in the Storage BMP should be met.

*Operation:* Collect the CGT at the gin, transport to the site and windrow. Windrow size will depend on equipment to be used to turn the composting material. A backhoe or front end loader can turn windrows up to 9 feet high. Most commercial windrow turning equipment will turn windrows 4 to 6 feet high. A tractor powered rotary tiller or "Do-All" can turn material up to 4 feet high.

When the CGT is windrowed, water should be added to bring the moisture levels up to 50-65%. Additional water will probably need to be added during the composting process to keep composting proceeding at an active rate. The composting material should be turned to insure the complete breakdown of the CGT, kill weed seeds and pathogens, and to prevent odors. Weekly turning will promote the rapid breakdown of the CGT into compost. Turning intervals can be lengthened as temperatures decrease. Further turning may not be needed after temperature drops below 100°F. The compost may be stored in larger piles until it is used.

*Use:* The compost may be broadcast on the fields and incorporated or left on the surface. The application rate guidelines contained in the Land Application BMP should be followed in applying the CGT compost to fields.