DEP Form 62-210.900(3)

Application for Air Permit – Non-Title V Source
Construction Permit Application

for

Burkhead Gin Company
Jay, FL

November 2001

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Prepared by:
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Copies to:
DEP (4)
Burkhead Gin Co.
file

Introduction

Burkhead Gin is an existing cotton ginning facility located in Jay, FL. It is operating under an existing DEP permit 1130027-001-AO. The application for construction permit is being filed to incorporate the changes that have been done to the facility through the years and to establish true picture of facility as it is now. It also incorporates an increase rate of production to 60,000 bales/yr and hours of operation to 3,000 hr/yr. Facility is located on approximately 2 acres of land on Highway 89 just North of Highway 4.. Facility layout is shown on attached plot plan.

Process of ginning cotton consists of removing seeds, trash and motes from harvested cotton brought into the gin. Harvested cotton brought into the gin is called seed cotton; it contains seeds, trash, twigs and other trash and is usually damp. To enhance ginning process which basically removes all undesirable contents such as mentioned above, cotton is conveyed pneumatically by heated air. Heat is provided by several heaters using natural gas burners. Entire process of conveying cotton through different stages of ginning is accomplished by arrangement of push-pull air conveying systems consisting of supply and exhaust blowers/fans and a system of ductwork called blowpipes. After ginning process, cotton is called lint, or as referred to in this application lint cotton. Motes are cotton fibers of lower quality and are a byproduct of ginning. They are also collected and pressed into bales for resale.

Process of ginning for all practical purposes and for keeping filing fees economical is considered one single emissions unit. In actuality it consists of the following activities:

Unloading (of seed cotton)
Drying and cleaning (of seed cotton)
Ginning (of seed cotton)
Cleaning of lint (cotton)
Pressing (baling) of lint (cotton)
Trash and motes removal
Trash handling
Seed handling

All the above activities are shown on attached process flow sheets.

Unloading

Unloading at this facility is done mainly by using unloading module, which is basically a building (enclosure) into which trailer loaded with cotton module is backed to. Rotating wheels with hooks chip cotton from module onto moving conveyor belt. From there seed cotton is picked up by suction blowpipe and carried to unloading separator. From unloading separator, seed cotton falls into feed controller. Feed controller is a device which controls speed of unloading of cotton to match process rate of ginning to avoid backups or overflows. Suction required to move cotton through blowpipe is provided by a suction (pull) fan.

The exhaust from this fan terminates in cyclones #1 & #2. This facility also has the old system of unloading cotton, using suction pipe moved across trailer of loose cotton to be pulled into the process. This system is used infrequently.

From feed controller, seed cotton falls into a blowpipe which pneumatically conveys cotton into three streams of drying and cleaning. Cotton is pushed through this process by an air supply blower using heated air provided by air heaters #1 & #2.

Drying and Cleaning

As mentioned earlier, drying and cleaning of seed cotton is done in three streams each consisting of first step tower dryer, incline cleaner, stick and burr machine, second step tower dryer and incline cleaner. Between first step and second step of cleaning, additional conveying stream of air is provided by two additional push blowers and two air heaters, #3 & #4. Trash, burrs and sticks removed by incline cleaners and stick and burr machines are pneumatically removed by exhaust systems (fans) delivering its contents to facility main trash plenum. Dried and clean seed cotton from all three streams falls into a distribution screw conveyor to be carried to gin stands.

Ginning

Ginning is accomplished by 4 gin stands into which seed cotton is feed by distribution conveyor. Gin stands separate seeds, motes and trash from seed cotton. From this point on, cotton is referred to as lint (cotton). Lint cotton is delivered by a pneumatic exhaust system to the next process called lint cleaning.

Trash and motes are picked up by an exhaust system terminating in cyclone #3.

Seeds fall into an enclosed screw conveyor which delivers them to seed handling system.

Lint (cotton) Cleaning and Pressing (Baling)

As mentioned earlier, lint cotton is pneumatically removed from gin stands and delivered into four streams (one from each gin stand). Each stream is equipped with super jet, lint cleaner #1 and #2. After cleaning, lint cotton is delivered into battery condenser by suction conveying system. Lint cotton is separated from exhaust air system in battery condenser and falls through a chute into a bale press, where it is pressed into bales as a finished product. Bales weigh approximately 500 lbs each. Exhaust blower providing suction exhausts into a dust house.

Motes and trash removed from lint cotton by super jet and cleaners are removed by exhaust blowers terminating in cyclones #4, #5, #6 and #7.

Fine fibers, called nits, are exhausted from lint cleaners by a separate exhaust stream terminating into cycles #9, #10, #11 & #12.

Seed Handling

Seed handling consists of seed screw conveyor picking seeds from 4 gin stands and several additional screw conveyors which deliver seeds to a seed house. From there, seeds are pneumatically blown into truck trailers for removal.

Trash and Mote System

Motes and trash removed from gin stands, are delivered to cyclone #3 as mentioned earlier. Motes and trash removed from lint cleaning process are delivered to cyclones #4, #5, #6, #7, #9, #10, #11, #12. All of these cyclones sit atop and discharge into trash and mote screw conveyor. From this conveyor, trash and motes are carried by a suction system and delivered into cyclone #8. Cyclone #8 empties into an inclined screen where trash is separated from the motes. From this screen, motes fall into a motes baler to be pressed and baled similar to lint cotton. Trash is pneumatically conveyed into facility main trash plenum.

Trash Handling

All trash produced by various activities of ginning process ends up in facility main trash plenum. From it trash is removed by a system of vacuum wheels to be emptied into a pneumatic system terminating into cyclone #25. Trash is also removed from this plenum by air streams terminating in cyclones #13, #14, #15, #16, #17, #18, #19, #20, #21, #22, #23 & #24. Cyclones #13, #15, #17, #19, #21, #23 & #25 sit atop and discharge trash into enclosed screw conveyor which delivers trash into a trailer parked underneath. Cyclones #14, #16, #18, #20, #22 & #24 also sit and discharge into another screw conveyor which delivers trash into a trailer parked underneath.

Cyclones used in this process are high efficiency type developed by Texas A & M University. Sizes are listed on attached list of cyclones.

PM Emissions are calculated emission factor listed in table published in AP 42 as attached.

Facility is to be limited to 60,000 bales of lint cotton / year and 3,000 hr/yr. Limits are established facility from becoming a major source, by limiting emissions to less than 100 TPY,

Maximum baling speeds is 32 bales/hr

Heaters used in process are rated as follows:

Heater #1 – 3 MM BTUH input
Heater #2 – 3 MM
Heater #3 – 3 MM
Heater #4 – 3 MM
Total - 12 MM BTUH input

Fuel used is natural gas

Emissions calculations from combustion of natural gas in these heaters shows emissions of less than 5 TPY of individual pollutant, allowing heaters to be exempt from permitting requirements according to rule 62-210(b)1.

Emissions Calculations

PM Emissions from ginning

Using emissions factors from AP 42 table 9.7-1

Unloading fan (SCC 3-01-004-01	0.29 lb/bale
No. 1 dryer and cleaner (SCC 3-02-004-20)	0.36
No. 2 dryer and cleaner (SCC 3-02-004-21)	0.24
Lint cleaners (SCC 3-02-004-07)	0.58
Mote fan (SCC 3-02-004-36)	0.28
Mote trash fan (SCC 3-02-004-36)	0.077
Battery condenser (SCC 3-02-004-08)	0.17
Master trash fan (SCC 3-02-004-03)	0.54
Total	2.537 lb/bale

Current DEP operation permit allows this facility to process 18,800 lb/hr of seed cotton for 2,016 hr/yr. for a total of 37,900,800 lb/yr of seed cotton. It takes 1500 lb/ of seed cotton to produce 500 lb bale of lint cotton. Therefore allowable bales/yr of lint cotton are: 37,900,800 / 1500 = 25,267 bales/yr

Existing PM emissions are:
PM = (25,267 bales/yr x 2.537 lb/bale) / 2,000 = 32.1 TPY

With new limit of 60,000 bales/yr potential PM emissions will be:
PM = (60,000 bales/yr x 2.537 lb/bale) / 2,000 = 76.1 TPY

Difference = 76.1 TPY – 32.1 = 44 TPY, making this a AC1D requiring processing fee of $2,000.00.

PM10 Emissions from battery condenser with screens

PM10 = (60,000 x 0.17 lb/bale x 0.5) / 2,000 = 2.6 TPY

Combustion Emissions from air heaters

Burkhead gin uses 4 air heaters totaling 12 MM BTUH heat input
Fuel is natural gas
Their records indicate that facility uses 147 CF of natural gas / bale of cotton.

60,000 bales/yr max. x 147 CF/bale = 8.8 MM CFY

Heaters are not exempt from permitting according to rule 62-210(3)(a)21b-Categorical Exemptions.

Calculating potential emissions from process heaters

Calculating potential emissions from process heaters

Hourly fuel usage is 12 MM BTUH / 1,050 BTU/CF = 0.011 MM CFH

Emissions factors from combustion of natural gas (SCC 1-03-006-03)

PM =	4.5 lb/MM CF burned
S02 =	0.6
N0X =	100
C0 =	21
VOC =	5.3

Proposed hours of operation are 3,000 hr/yr.

PM = ~~4.5~~ 7.6 x 0.011 x 3,000 / 2,000 = 0.1 TPY
S02 = 0.6 x 0.011 x 3,000 / 2,000 = negligible
N0X = 100 x 0.011 x 3,000 / 2,000 = 1.7 TPY
CO = ~~21~~ 84 x 0.011 x 3,000 / 2,000 = 0.3 TPY
VOC = 5.3 x 0.011 x 3,000 / 2,000 = 0.1 TPY

All regulated pollutants resulting from process heaters are less than 5 TPY
Total PM emissions from the facility are 76.1 TPY from ginning + 0.1 TPY from heaters = 76.2 TPY, less than 100 TPY, keeping facility from becoming Major (Title V) Source.

Therefore heaters qualify to be exempted from permitting under generic exemption rule 62-210(b)1.

Department of
Environmental Protection

Division of Air Resources Management

APPLICATION FOR AIR PERMIT - NON-TITLE V SOURCE

See Instructions for Form No. 62-210.900(3)

I. APPLICATION INFORMATION

Identification of Facility

1. Facility Owner/Company Name: Burkhead Gin Company	
2. Site Name:	
3. Facility Identification Number: 1130027 [ ] Unknown	
4. Facility Location: Street Address or Other Locator: 14294 Highway 89 N City: Jay County: Santa Rosa Zip Code: 32565	
5. Relocatable Facility? [ ] Yes [x] No	6. Existing Permitted Facility? [x] Yes [ ] No

Application Contact

1. Name and Title of Application Contact: Buddy Z. Burkhead, Owner
2. Application Contact Mailing Address: Organization/Firm: Burkhead Gin Company Street Address: P. O. Box 69 City: Jay State: FL Zip Code: 32565
3. Application Contact Telephone Numbers: Telephone: (850) 675-4636 Fax: ( ) -

Application Processing Information (DEP Use)

1. Date of Receipt of Application:	
2. Permit Number:	

Purpose of Application

Air Operation Permit Application

This Application for Air Permit is submitted to obtain: (Check one)

[ ] Initial non-Title V air operation permit for one or more existing, but previously unpermitted, emissions units.

[ ] Initial non-Title V air operation permit for one or more newly constructed or modified emissions units.

Current construction permit number:_____

[ ] Non-Title V air operation permit revision to address one or more newly constructed or modified emissions units.

Current construction permit number:_____

Operation permit number to be revised:_____

[ ] Initial non-Title V air operation permit under Rule 62-210.300(2)(b), F.A.C., for an existing facility seeking classification as a synthetic non-Title V source.

Current operation/construction permit number(s):

_____

[ ] Non-Title V air operation permit revision for a synthetic non-Title V source. Give reason for revision; e.g., to address one or more newly constructed or modified emissions units.

Operation permit number to be revised:_____

Reason for revision:_____

Air Construction Permit Application

This Application for Air Permit is submitted to obtain: (Check one)

[x] Air construction permit to construct or modify one or more emissions units.

[ ] Air construction permit to make federally enforceable an assumed restriction on the potential emissions of one or more existing, permitted emissions units.

[ ] Air construction permit for one or more existing, but unpermitted, emissions units.

Owner/Authorized Representative

1. Name and Title of Owner/Authorized Representative: Buddy Z. Burkhead, Owner

2. Owner/Authorized Representative Mailing Address:
   Organization/Firm: Burkhead Gin Company
   Street Address: P. O. Box 69
   City: Jay State: FL Zip Code: 32565

3. Owner/Authorized Representative Telephone Numbers:
   Telephone: (850) 675-4636 Fax: ( ) -

4. Owner/Authorized Representative Statement:

   I, the undersigned, am the owner or authorized representative of the facility addressed in this application. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made in this application are true, accurate and complete and that, to the best of my knowledge, any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. The air pollutant emissions units and air pollution control equipment described in this application will be operated and maintained so as to comply with all applicable standards for control of air pollutant emissions found in the statutes of the State of Florida and rules of the Department of Environmental Protection and revisions thereof. I understand that a permit, if granted by the Department, cannot be transferred without authorization from the Department, and I will promptly notify the Department upon sale or legal transfer of any permitted emissions unit.*

   Buddy Burkhead 12-03-01

   Signature Date

* Attach letter of authorization if not currently on file.

Professional Engineer Certification

Professional Engineer Certification

1. Professional Engineer Name: Kresimir C. Šviglin
   Registration Number: 49223

2. Professional Engineer Mailing Address:
   Organization/Firm: Pensacola P.O.C., Inc.
   Street Address: 109 South Second Street
   City: Pensacola State: FL Zip Code: 32507

3. Professional Engineer Telephone Numbers:
   Telephone: (850) 456-4406 Fax: (850) 4564426-

4. Professional Engineer Statement:

I, the undersigned, hereby certify, except as particularly noted herein, that:*

(1) To the best of my knowledge, there is reasonable assurance that the air pollutant emissions unit(s) and the air pollution control equipment described in this Application for Air Permit, when properly operated and maintained, will comply with all applicable standards for control of air pollutant emissions found in the Florida Statutes and rules of the Department of Environmental Protection; and

(2) To the best of my knowledge, any emission estimates reported or relied on in this application are true, accurate, and complete and are either based upon reasonable techniques available for calculating emissions or, for emission estimates of hazardous air pollutants not regulated for an emissions unit addressed in this application, based solely upon the materials, information and calculations submitted with this application.

If the purpose of this application is to obtain an air construction permit for one or more proposed new or modified emissions units (check here [x], if so), I further certify that the engineering features of each such emissions unit described in this application have been designed or examined by me or individuals under my direct supervision and found to be in conformity with sound engineering principles applicable to the control of emissions of the air pollutants characterized in this application.

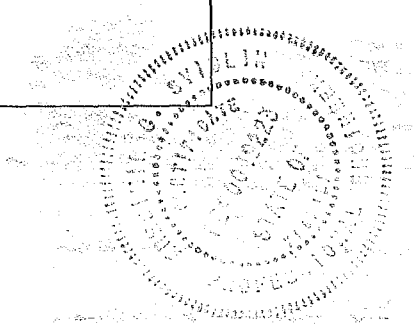
If the purpose of this application is to obtain an initial air operation permit or operation permit revision for one or more newly constructed or modified emissions units (check here [ ], if so), I further certify that, with the exception of any changes detailed as part of this application, each such emissions unit has been constructed or modified in substantial accordance with the information given in the corresponding application for air construction permit and with all provisions contained in such permit.

K. C. Knight — Signature

11/4/01 — Date

(seal)

* Attach any exception to certification statement.



Scope of Application

Emissions Unit ID	Description of Emissions Unit	Permit Type	Processing Fee
001	Cotton Gin	AC1D	2,000.00

Application Processing Fee

Check one: [x] Attached - Amount: $__2,000.00_____ [ ] Not Applicable_

Construction/Modification Information

1. Description of Proposed Project or Alterations: See "Introduction"
2. Projected or Actual Date of Commencement of Construction:
3. Projected Date of Completion of Construction:

Application Comment

See "Introduction"

II. FACILITY INFORMATION

A. GENERAL FACILITY INFORMATION

Facility Location and Type

1. Facility UTM Coordinates: Zone: 16 East (km): 485.3 North (km): 3425.80			
2. Facility Latitude/Longitude: Latitude (DD/MM/SS): 30/57/22 Longitude (DD/MM/SS): 87/08/43			
3. Governmental Facility Code: 0	4. Facility Status Code: A	5. Facility Major Group SIC Code: 0724	6. Facility SIC(s):
7. Facility Comment (limit to 500 characters): See "Introduction"			

Facility Contact

1. Name and Title of Facility Contact: Buddy Z. Burkhead, Owner
2. Facility Contact Mailing Address: Organization/Firm: Burkhead Gin Company Street Address: P. O. Box 69 City: Jay State: FL Zip Code: 32565
3. Facility Contact Telephone Numbers: Telephone: (850) 675-4636 Fax: ( ) -

Facility Regulatory Classifications

Check all that apply:

1. [x] Small Business Stationary Source?	[ ] Unknown
2. [x] Synthetic Non-Title V Source?	
3. [ ] Synthetic Minor Source of Pollutants Other than HAPs?	
4. [ ] Synthetic Minor Source of HAPs?	
5. [ ] One or More Emissions Units Subject to NSPS?	
6. [ ] One or More Emission Units Subject to NESHAP Recordkeeping or Reporting?	
7. Facility Regulatory Classifications Comment (limit to 200 characters):	

Rule Applicability Analysis

B. FACILITY POLLUTANTS

List of Pollutants Emitted

1. Pollutant Emitted	2. Pollutant Classif.	3. Requested Emissions Cap lb/hour	tons/year	4. Basis for Emissions Cap	5. Pollutant Comment
PM	PM		80	Other	Escape Title V

C. FACILITY SUPPLEMENTAL INFORMATION

Supplemental Requirements

1. Area Map Showing Facility Location: [x] Attached, Document ID:_Doc. "A" [ ] Not Applicable [ ] Waiver Requested
2. Facility Plot Plan: [x] Attached, Document ID:_Doc. "B" [] Not Applicable [ ] Waiver Requested
3. Process Flow Diagram(s): [x] Attached, Document ID: Doc. "C" [ ] Not Applicable [ ] Waiver Requested
4. Precautions to Prevent Emissions of Unconfined Particulate Matter: [x] Attached, Document ID: Doc. "D" [] Not Applicable [ ] Waiver Requested
5. Supplemental Information for Construction Permit Application: [ ] Attached, Document ID:____ [x] Not Applicable
6. Supplemental Requirements Comment:

III. EMISSIONS UNIT INFORMATION

A separate Emissions Unit Information Section (including subsections A through G as required) must be completed for each emissions unit addressed in this Application for Air Permit. If submitting the application form in hard copy, indicate, in the space provided at the top of each page, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application.

A. GENERAL EMISSIONS UNIT INFORMATION

Emissions Unit Description and Status

1. Type of Emissions Unit Addressed in This Section: (Check one)

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

[x] This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

2. Description of Emissions Unit Addressed in This Section (limit to 60 characters): See "Introduction"

3. Emissions Unit Identification Number: ID1130027
[ ] No ID
[ ] ID Unknown

4. Emissions Unit Status Code: A	5. Initial Startup Date:	6. Emissions Unit Major Group SIC Code: 0724

7. Emissions Unit Comment: (Limit to 500 Characters) See "Introduction"

Emissions Unit Control Equipment

1. Control Equipment/Method Description (limit to 200 characters per device or method): See "Introduction" Supplemental Information – Doc. "E"
2. Control Device or Method Code(s): 9

Emissions Unit Details

1. Package Unit: Manufacturer:	Model Number:	
2. Generator Nameplate Rating:	MW	
3. Incinerator Information: Dwell Temperature: Dwell Time: Incinerator Afterburner Temperature:		°F seconds °F

Emissions Unit Operating Capacity and Schedule

1. Maximum Heat Input Rate:	12		mmBtu/hr
2. Maximum Incineration Rate:	lb/hr		tons/day
3. Maximum Process or Throughput Rate:			
4. Maximum Production Rate: 60,000 bales/yr			
5. Requested Maximum Operating Schedule: hours/day weeks/year		3,000	days/week hours/year
6. Operating Capacity/Schedule Comment (limit to 200 characters):			

B. EMISSION POINT (STACK/VENT) INFORMATION

Emission Point Description and Type

1. Identification of Point on Plot Plan or Flow Diagram? Cyclones 1-25	2. Emission Point Type Code: 3	
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking (limit to 100 characters per point): Cyclones 1-25 + condenser dust house		
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common:		
5. Discharge Type Code: W	6. Stack Height: varies feet	7. Exit Diameter: varies feet
8. Exit Temperature: varies °F	9. Actual Volumetric Flow Rate: see Doc. "E" acfm	10. Water Vapor: %
11. Maximum Dry Standard Flow Rate: dscfm	12. Nonstack Emission Point Height: feet	
13. Emission Point UTM Coordinates: Zone: East (km): North (km):		
14. Emission Point Comment (limit to 200 characters): See Plot Plan, Doc. "B" for location of all emissions points (cyclones & dust house).		

C. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment __1__ of __1___

1. Segment Description (Process/Fuel Type) (limit to 500 characters): Industrial Process: Food and Agriculture: Cotton Ginning: General-Entire Process, Sum of Typical Equipment Used. Bale cotton process		
2. Source Classification Code (SCC): 3-02-004-10	3. SCC Units: bale cotton process	
4. Maximum Hourly Rate:	5. Maximum Annual Rate: 60,000	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur: N/A	8. Maximum % Ash: N/A	9. Million Btu per SCC Unit: N/A
10. Segment Comment (limit to 200 characters):		

Segment Description and Rate: Segment _____ of _____

1. Segment Description (Process/Fuel Type) (limit to 500 characters):		
2. Source Classification Code (SCC):	3. SCC Units:	
4. Maximum Hourly Rate:	5. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment (limit to 200 characters):		

D. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION

Potential Emissions

1. Pollutant Emitted: PM		2. Pollutant Regulatory Code: NS
3. Primary Control Device Code: 007	4. Secondary Control Device Code:	5. Total Percent Efficiency of Control:
6. Potential Emissions: lb/hour 76.1 tons/year		7. Synthetically Limited? [x]
8. Emission Factor: See "Emissions Calculations" Reference:		9. Emissions Method Code: 3
10. Calculation of Emissions (limit to 600 characters): See "Emissions Calculations"		
11. Pollutant Potential Emissions Comment (limit to 200 characters):		

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code: ESCTV	2. Future Effective Date of Allowable Emissions: ASAP
3. Requested Allowable Emissions and Units: 80 TPY	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance (limit to 60 characters): limiting process to 60,000 bales / yr of lint cotton	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters):	

D. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION

Potential Emissions

1. Pollutant Emitted: PM10	2. Pollutant Regulatory Code: NS	
3. Primary Control Device Code: 007	4. Secondary Control Device Code:	5. Total Percent Efficiency of Control:
6. Potential Emissions: lb/hour 2.6 tons/year		7. Synthetically Limited? [N]
8. Emission Factor: See "Emissions Calculations" Reference:		9. Emissions Method Code: 3
10. Calculation of Emissions (limit to 600 characters): See "Emissions Calculations"		
11. Pollutant Potential Emissions Comment (limit to 200 characters):		

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance (limit to 60 characters):	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters):	

E. VISIBLE EMISSIONS INFORMATION
(Only Emissions Units Subject to a VE Limitation)

Visible Emissions Limitation: Visible Emissions Limitation ____1__ of __1____

1. Visible Emissions Subtype: VE20	2. Basis for Allowable Opacity: [ ] Rule [ ] Other
3. Requested Allowable Opacity: Normal Conditions: 20% Exceptional Conditions: 20% Maximum Period of Excess Opacity Allowed: n/a min/hour	
4. Method of Compliance: yearly ½ hr VE tests	
5. Visible Emissions Comment (limit to 200 characters): VE test to be conducted on worst of the following groups of cyclones: 1) Unloading 2) Drying, cleaning & ginning 3) lint cleaning and baling 4) Trash & Motes	

F. CONTINUOUS MONITOR INFORMATION
(Only Emissions Units Subject to Continuous Monitoring)

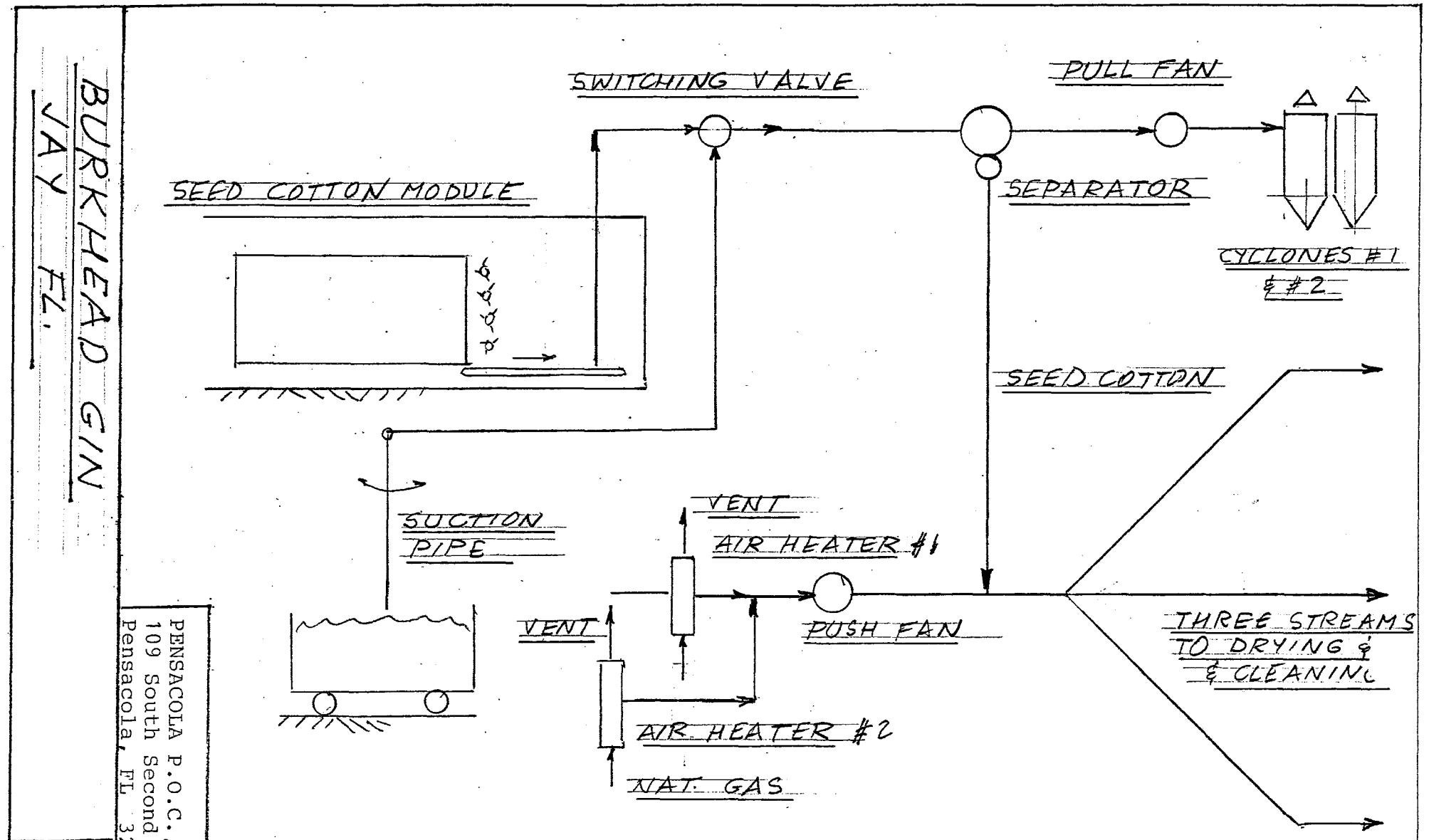
Continuous Monitoring System: Continuous Monitor _____ of _____

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement:	[ ] Rule [ ] Other
4. Monitor Information: Manufacturer: Model Number: Serial Number:	
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment (limit to 200 characters):	

G. EMISSIONS UNIT SUPPLEMENTAL INFORMATION

Supplemental Requirements

1. Process Flow Diagram [x] Attached, Document ID: Doc. "C" [ ] Not Applicable [ ] Waiver
2. Fuel Analysis or Specification n/a [ ] Attached, Document ID:_____ [x] Not Applicable [ ] Waiver Requested
3. Detailed Description of Control Equipment [x] Attached, Document ID: Doc. "E" [ ] Not Applicable [ ] Waiver Requested
4. Description of Stack Sampling Facilities n/a [ ] Attached, Document ID:_____ [x] Not Applicable [ ] Waiver Requested
5. Compliance Test Report [ ] Attached, Document ID:_____ [x] Previously submitted, Date: Oct. 18, 2001 [ ] Not Applicable
6. Procedures for Startup and Shutdown [ ] Attached, Document ID:_____ [x] Not Applicable [ ] Waiver Requested
7. Operation and Maintenance Plan [x] Attached, Document ID:_Doc. " F" [ ] Not Applicable [ ] Waiver Requested
8. Supplemental Information for Construction Permit Application [ ] Attached, Document ID: [x] Not Applicable
9. Other Information Required by Rule or Statute [ ] Attached, Document ID:_____ [x] Not Applicable
10. Supplemental Requirements Comment:



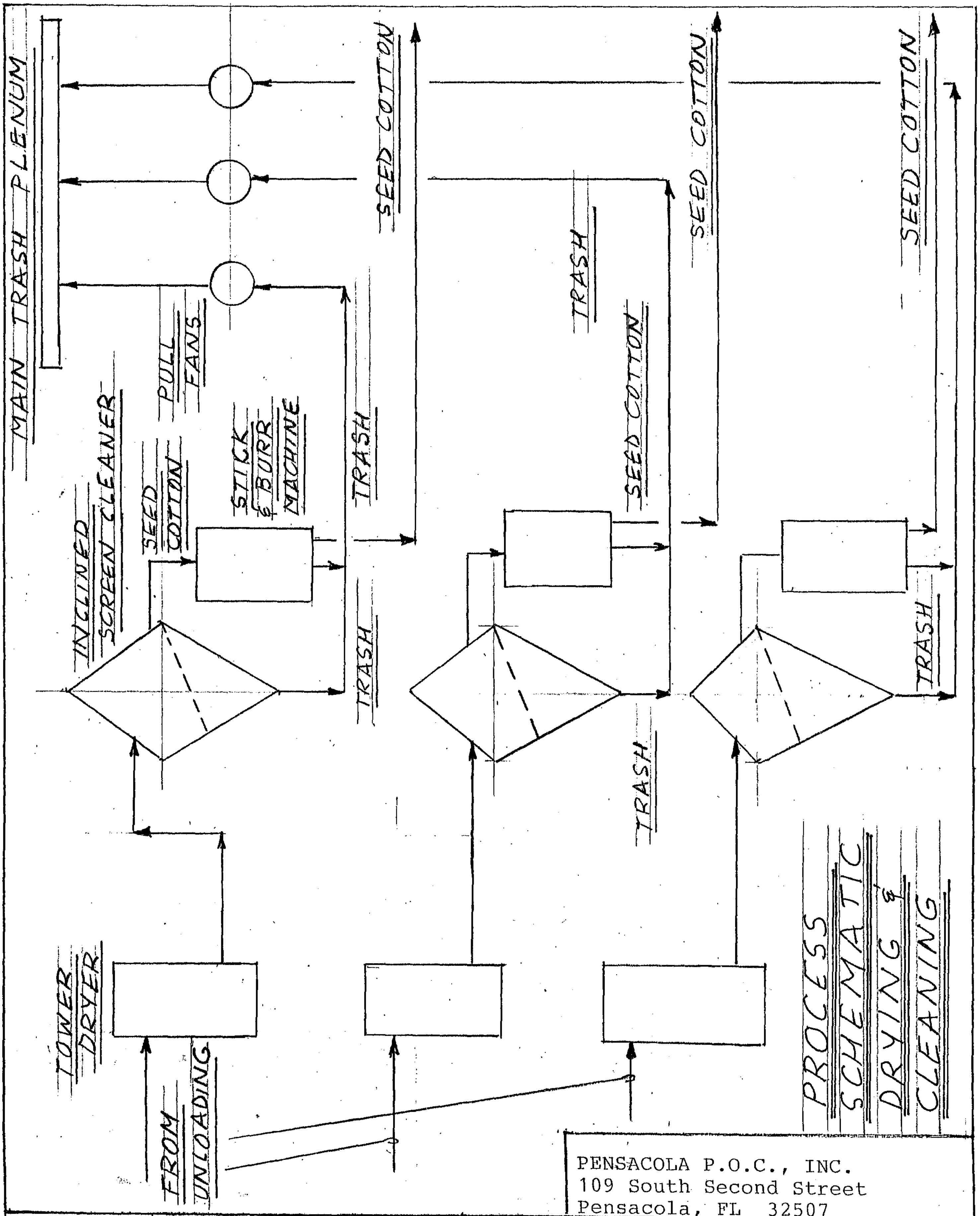
PROCESS FLOWSHEET UNLOADING

BURKHEAD GIN
JAY FL.

PENSACOLA P.O.C., INC.
109 South Second Street
Pensacola, FL 32507

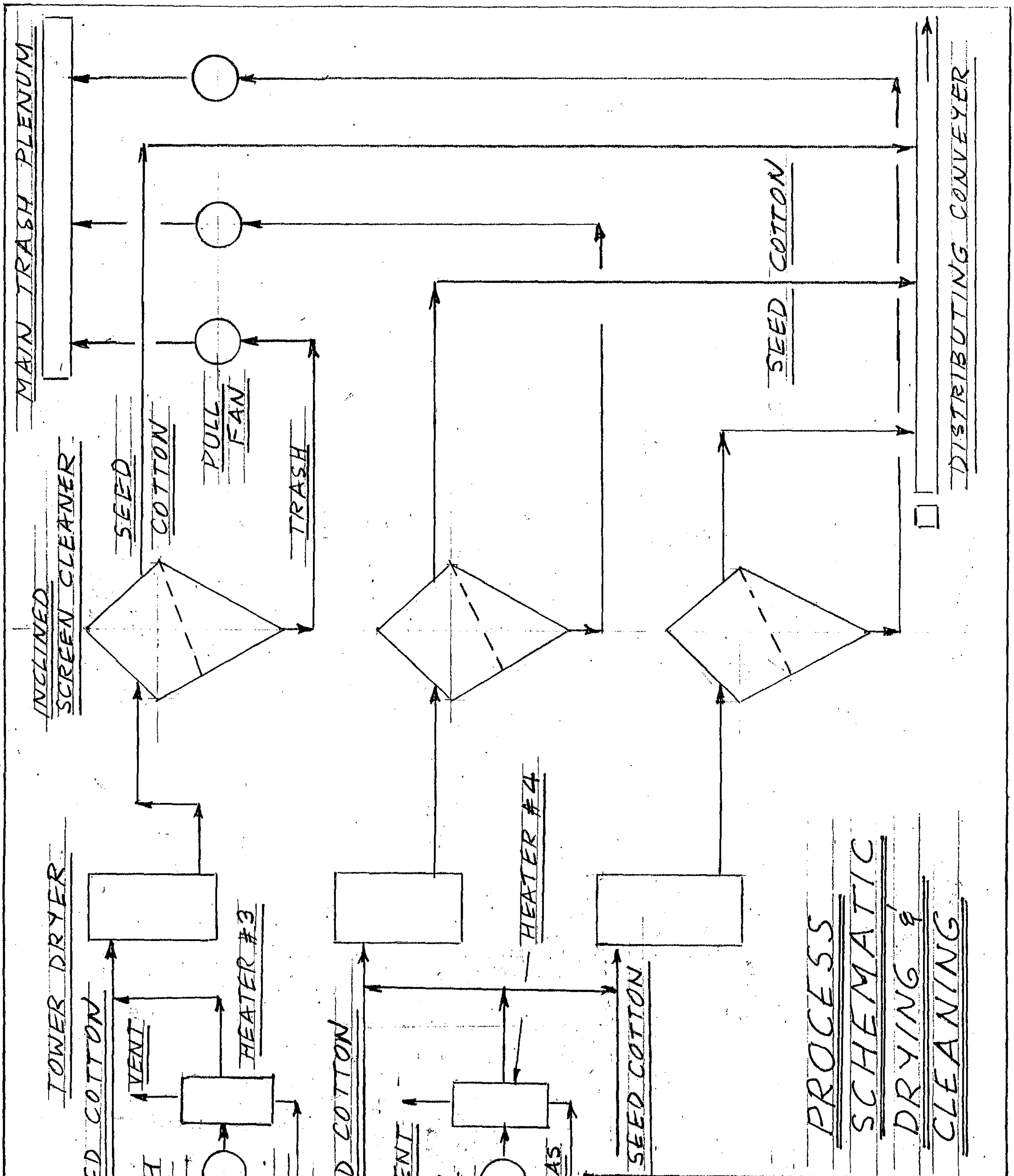
Scale	NONE
Date	11/14/01

Sketch 1 of 12



PENSACOLA P.O.C., INC.
109 South Second Street
Pensacola, FL 32507

BURKHEAD GIN JAY FL.	Date 11/14/01 Scale NONE



PENSACOLA P.O.C., INC.
109 South Second Street
Pensacola, FL 32507

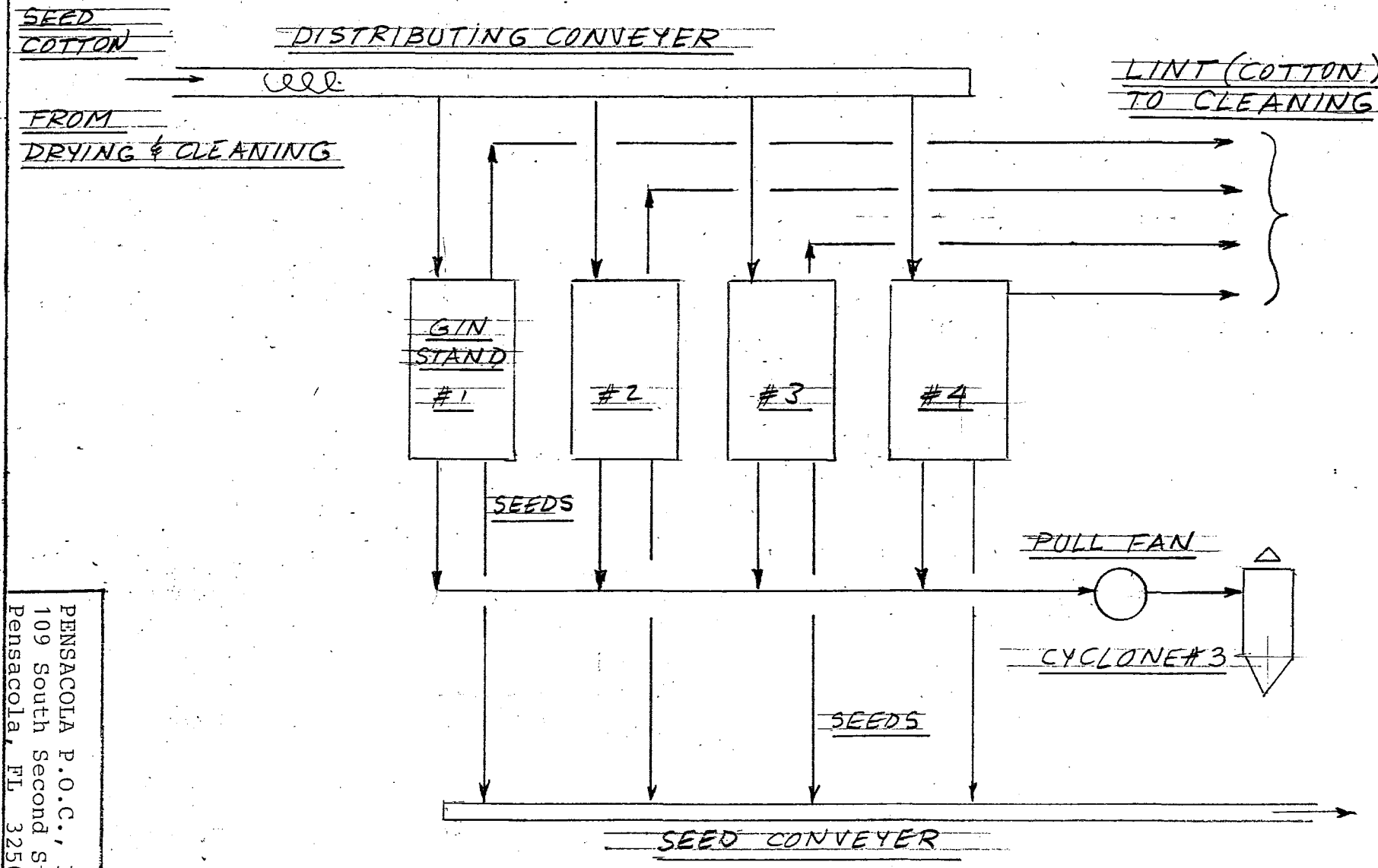
BURKHEAD GIN
JAY FL.

Date	11/14/01
Scale	NONE

Sketch 3 of 12

BURKHEAD GIN

JAY FL.



PROCESS SCHEMATIC

GINNING

PENSACOLA P.O.C., INC.
109 South Second Street
Pensacola, FL 32507

Scale	Date
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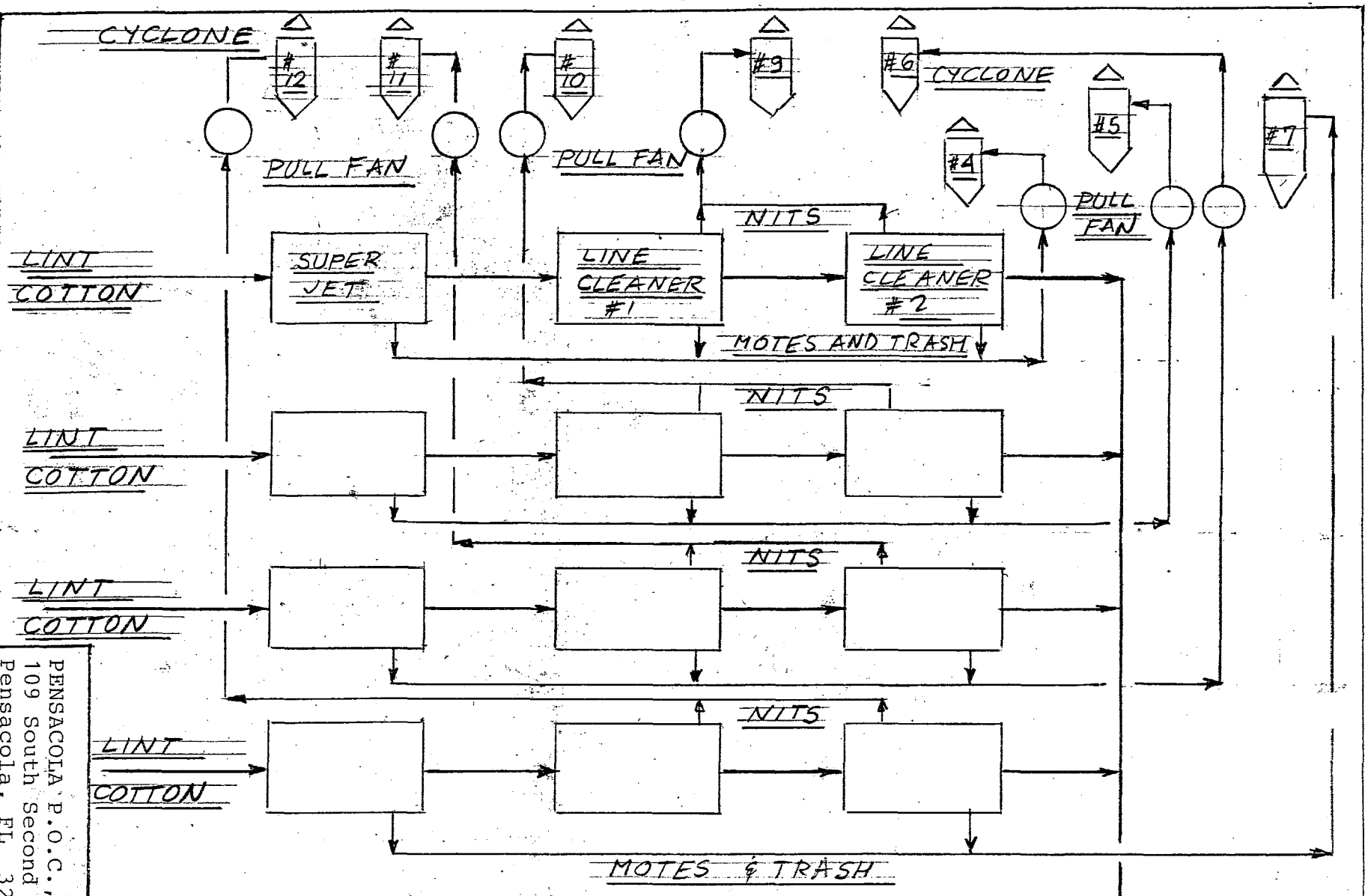


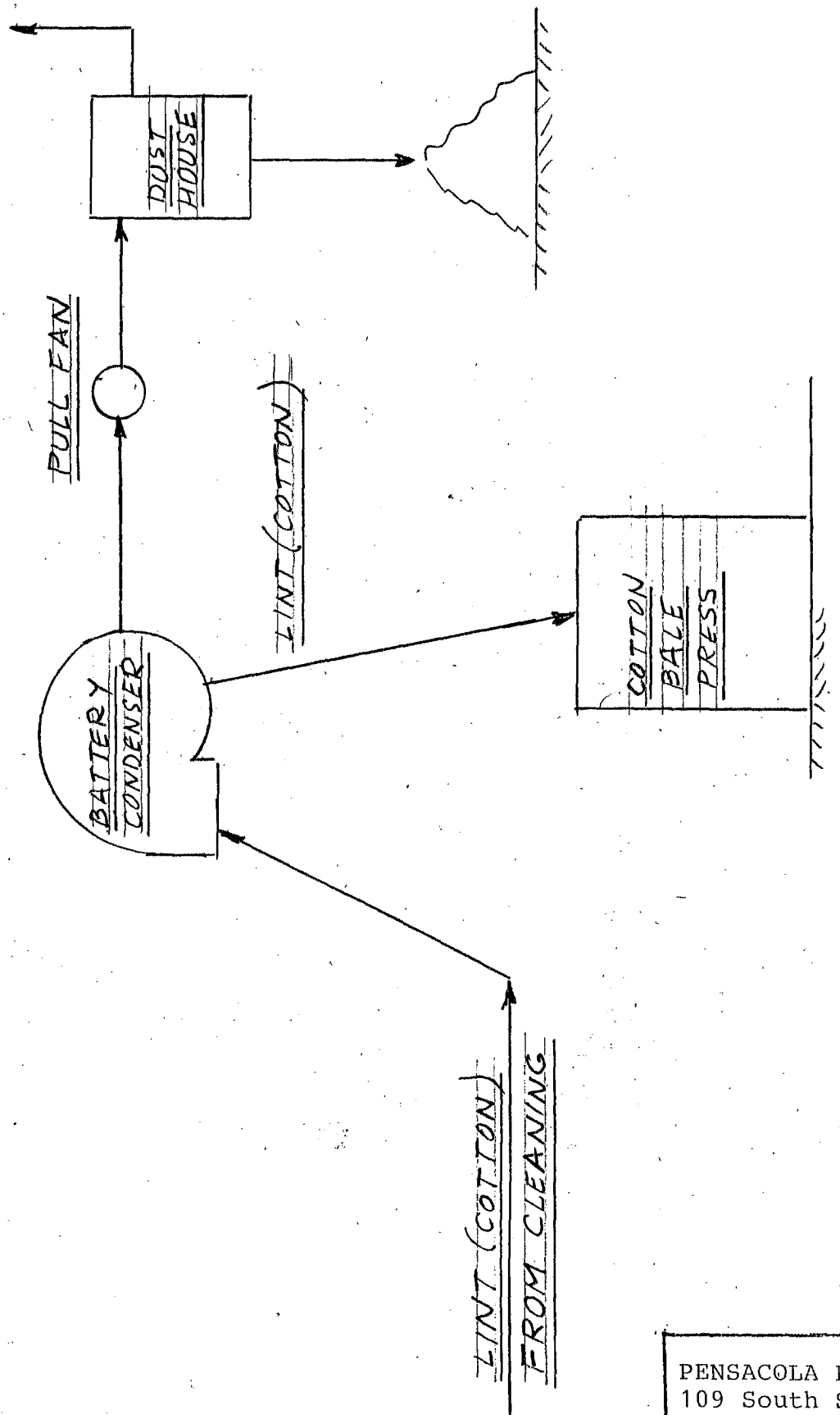
PROCESS SCHEMATIC
LINT (COTTON) CLEANING

BURKHEAD GIN
JAY FL.

PENSACOLA P.O.C., INC.
109 South Second Street
Pensacola, FL 32507

Scale	NONE
Date	11/14/01

Sketch 5 of 12

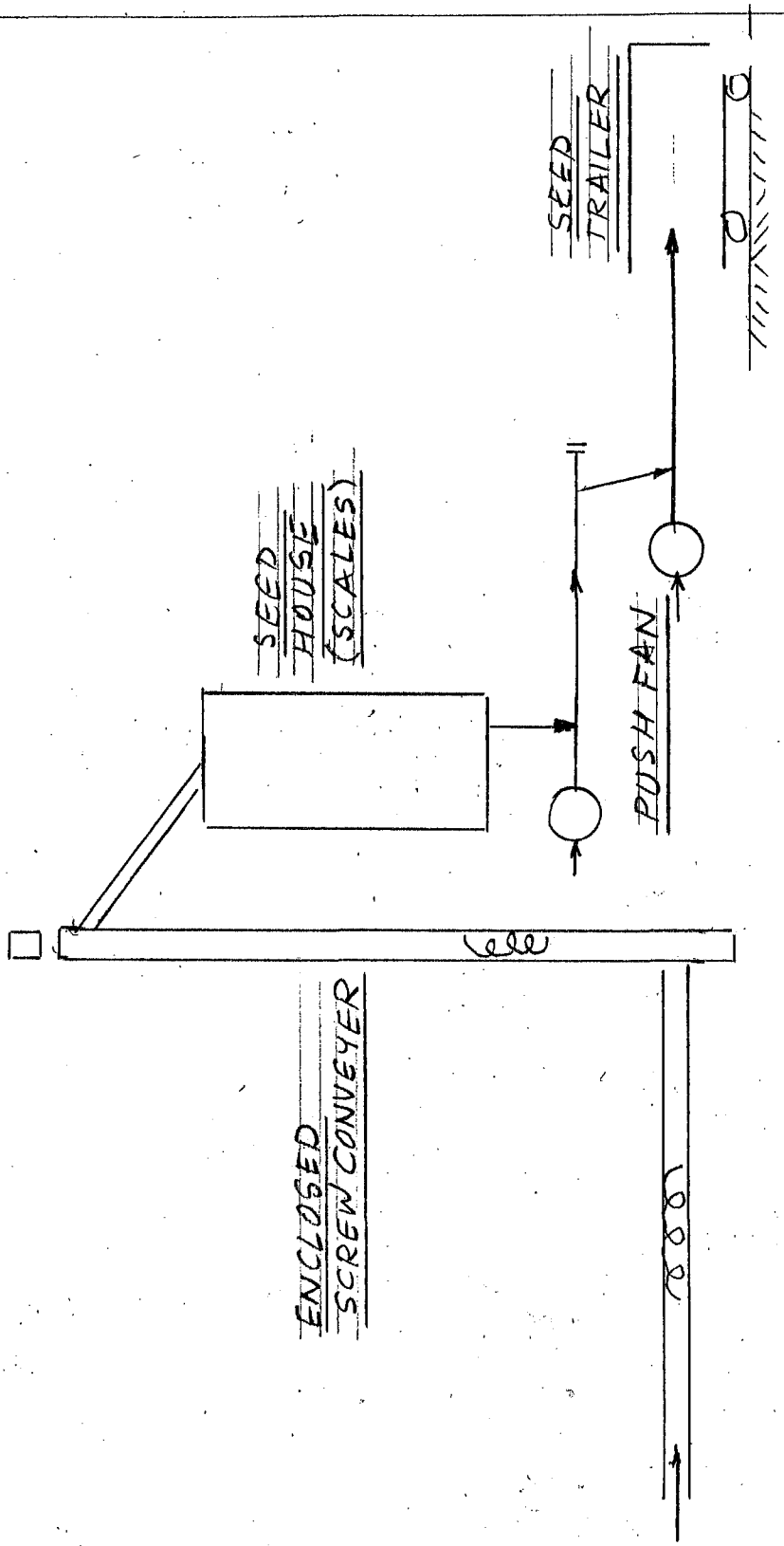


PROCESS SCHEMATIC
LINT (COTTON) PRESSING (BALING)

PENSACOLA P.O.C., INC.
109 South Second Street
Pensacola, FL 32507

BURKHEAD GIN
JAY FL.

Date	11/14/01
Scale	NONE

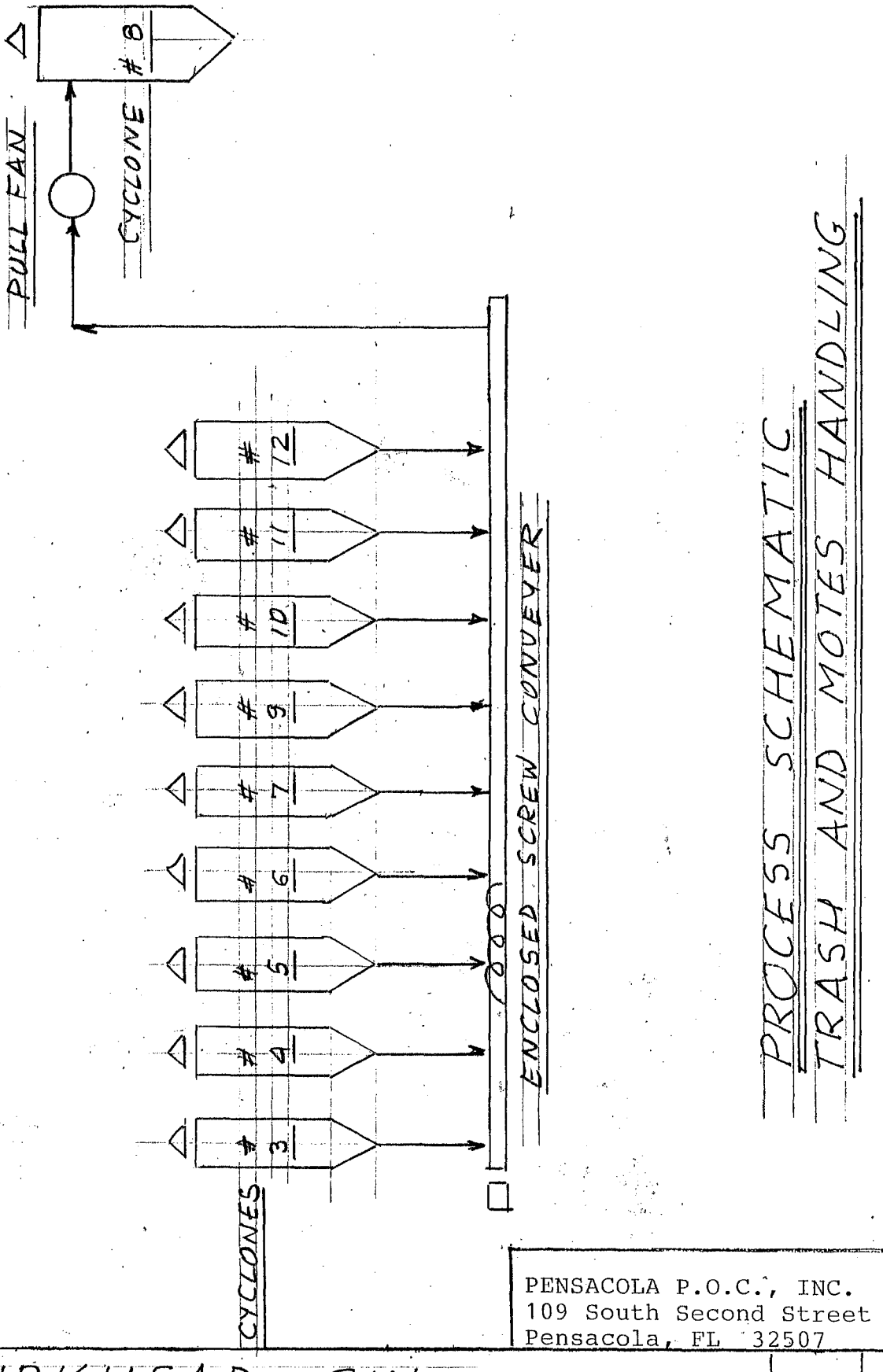


PROCESS SCHEMATIC
SEED HANDLING

PENSACOLA P.O.C., INC.
109 South Second Street
Pensacola, FL 32507

BURKHEAD GIN
JAY FL.

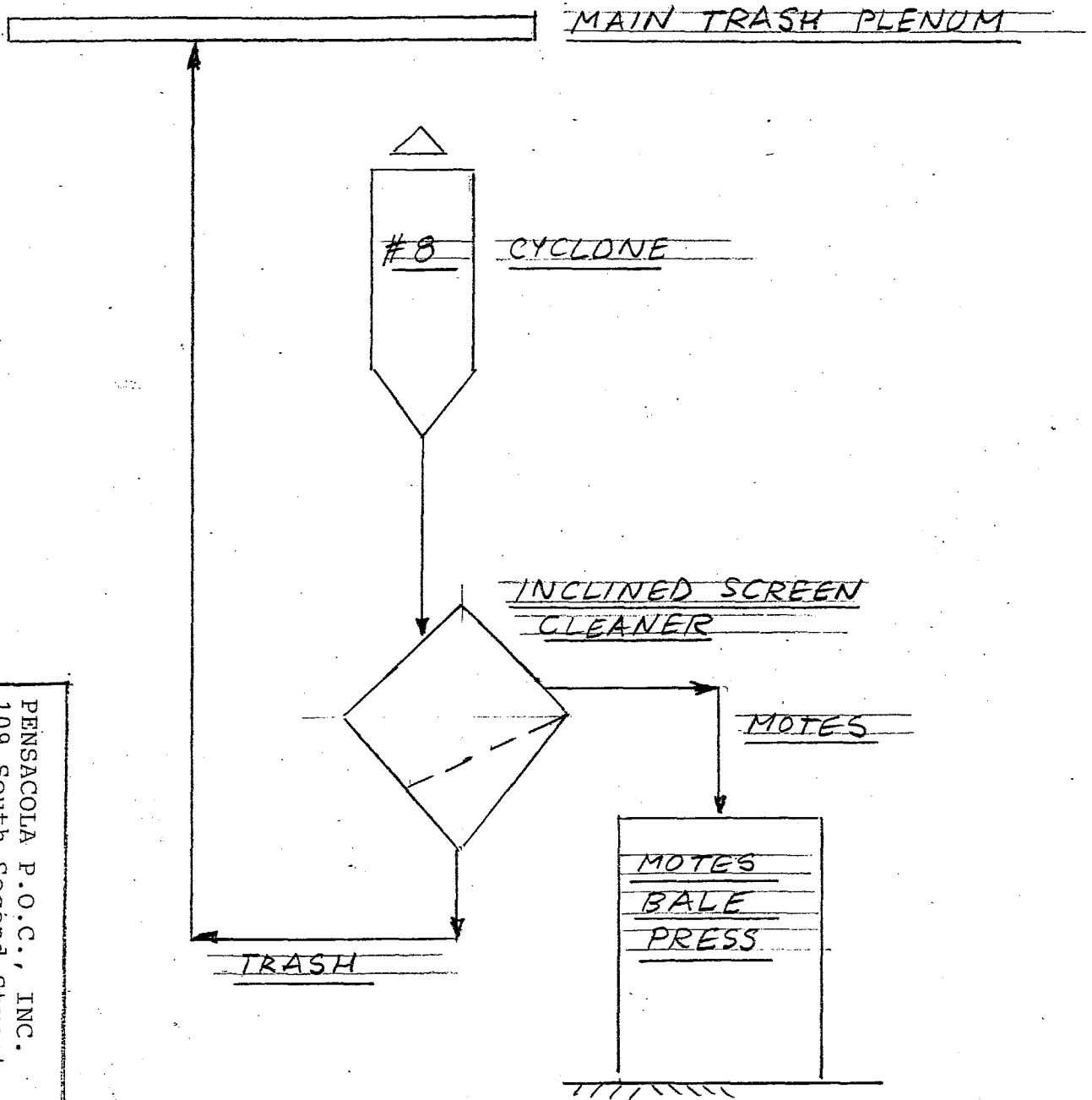
Date	11/14/01
Scale	NONE



PENSACOLA P.O.C., INC.
109 South Second Street
Pensacola, FL 32507

BURKHEAD GIN
JAY FL.

Date	11/14/01
Scale	NONE



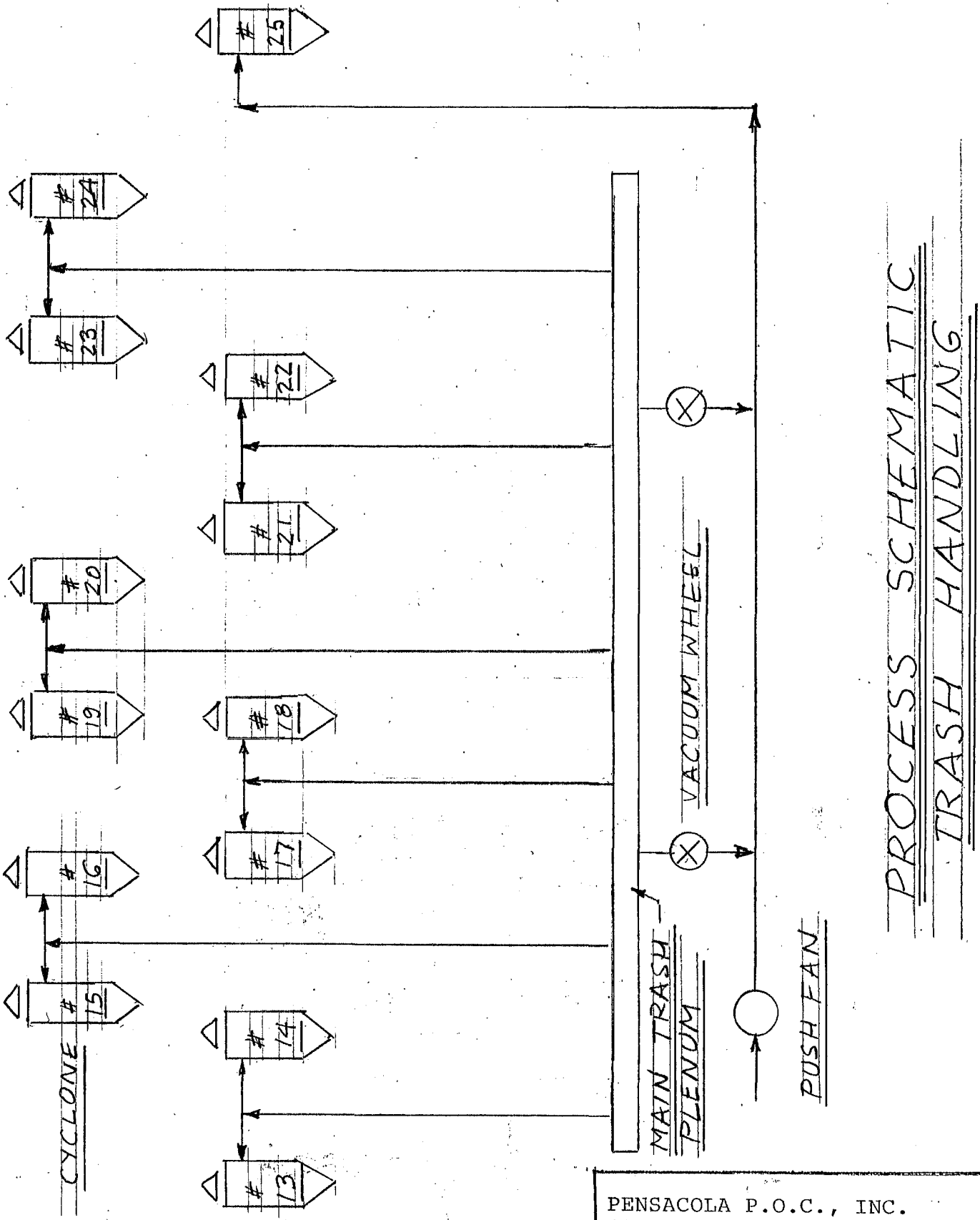
PROCESS SCHEMATIC - TRASH & MOTES

BURKHEAD GIN
JAY FL.

PENSACOLA P.O.C., INC.
109 South Second Street
Pensacola, FL 32507

Scale	Date
NONE	11/14/01

Sketch 9 of 17



PENSACOLA P.O.C., INC.
109 South Second Street
Pensacola, FL 32507

BURKHEAD GIN
JAY FL.

Date	11/14/01
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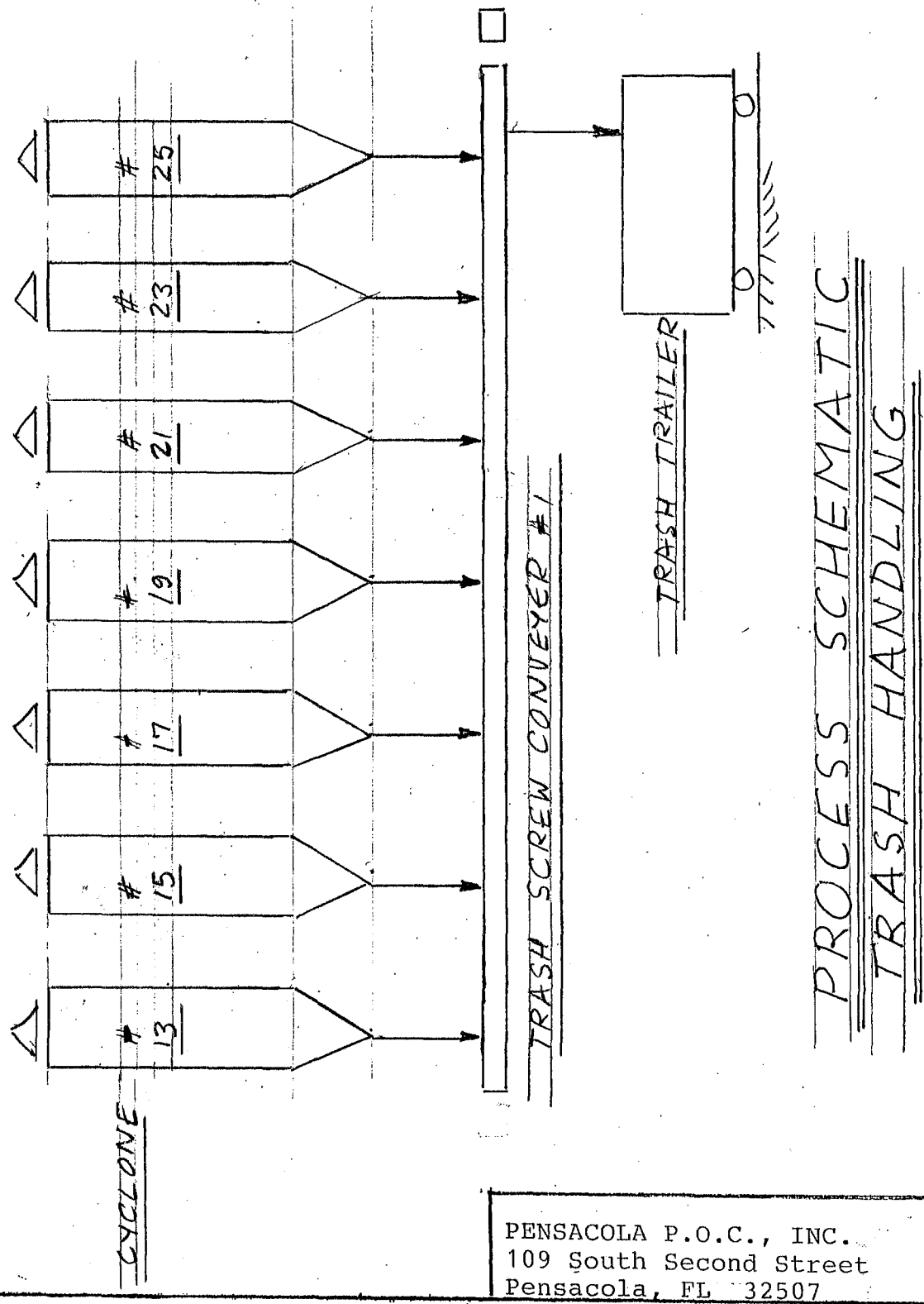
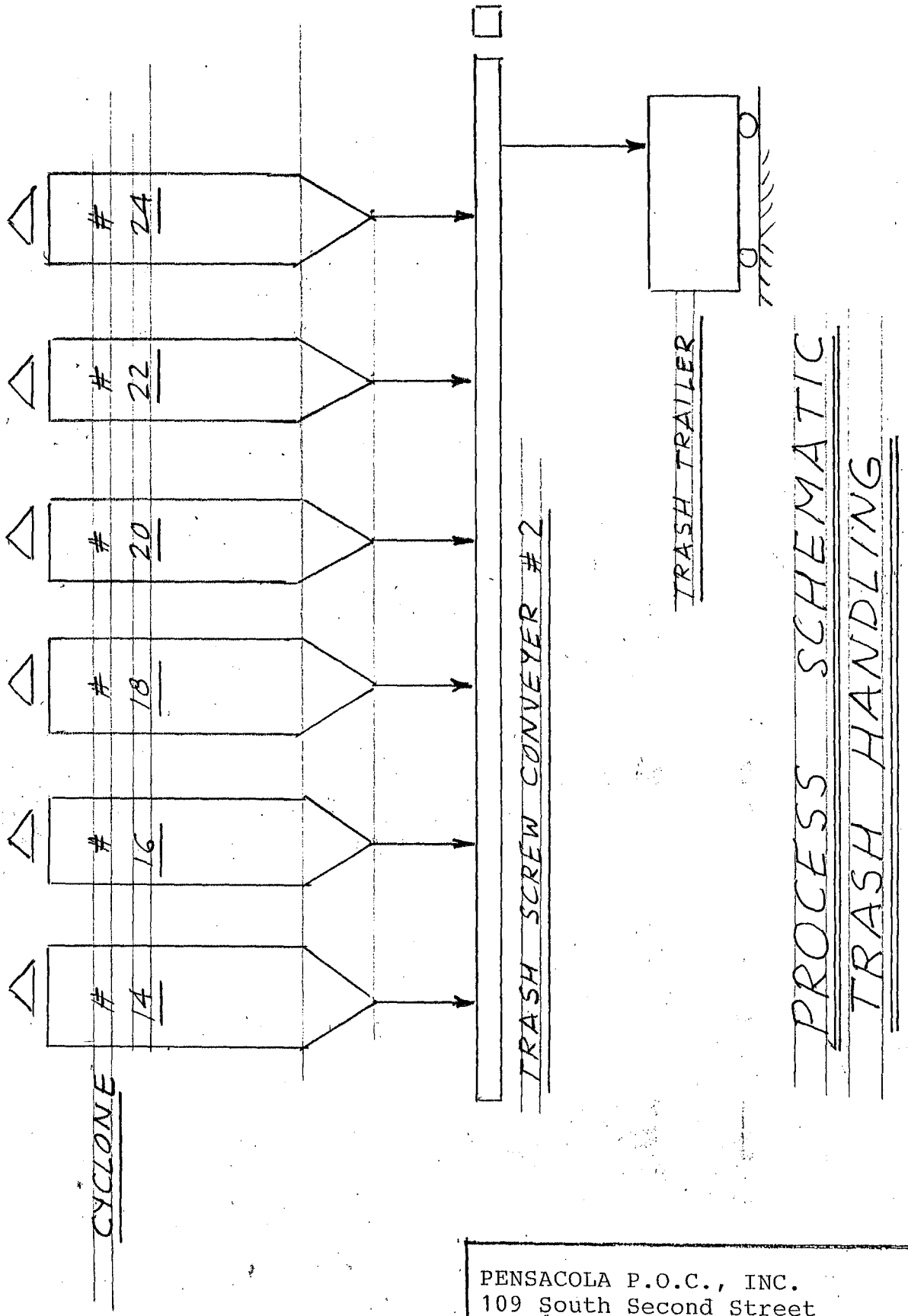


PENSACOLA P.O.C., INC.
109 South Second Street
Pensacola, FL 32507

BURKHEAD GIN
JAY FL

Date	11/14/01
Scale	NONE



PENSACOLA P.O.C., INC.
109 South Second Street
Pensacola, FL 32507

BURKHEAD GIN
JAY FL.

Date	11/14/01
Scale	NONE

Precautions to Prevent Emissions of Unconfined PM

This facility is located in a farming area and surrounded by farm land.

Ginning and handling of cotton is accomplished under roof inside gin building. All cotton and byproducts such as lint, trash and seeds are handled by fully enclosed screw conveyors or blow pipes which are terminated by cyclones located in the open. All trash produced by this operation is terminated in cyclones from which it is dumped into trailers, closed on four sides (only tops are open). All seeds produced by this process are handled by fully enclosed screw conveyors and blow pipes to be delivered inside enclosed trailers.

In general, cotton ginning is accompanied by a certain amount of fugitive emissions in spite of the latest improvements and technologies associated with ginning process. By maintaining the equipment, watching the process, and removal of debris and trash from facility on a regular basis will help keep fugitive emissions to a minimum. Important aspect regarding fugitive emissions is the fact that these emissions are bio-degradable and are a good fertilizer for surrounding farms.

Cyclone Schedule

Cyclone #	Diameter
#1	48"
#2	48"
#3	32"
#4	36"
#5	36"
#6	36"
#7	36"
#8	60"
#9	60"
#10	60"
#11	60"
#12	60"
#13	48"
#14	48"
#15	48"
#16	48"
#17	48"
#18	48"
#19	48"
#20	48"
#21	48"
#22	48"
#23	48"
#24	48"
#25	24"

PAPER NO._____

PREDICTED EFFECTS OF THE USE OF NEW CYCLONE DESIGNS ON AGRICULTURAL PROCESSING PARTICULATE EMISSIONS

by

Calvin B. Parnell, Jr., Assoc. Professor
and
Doug Davis, Research Assistant
Department of Agricultural Engineering
Texas A&M University
College Station, Texas 77843

For Presentation at the 1979 Southwest Region Meeting
American Society of Agricultural Engineers

Hot Springs, Arkansas
April 25-27, 1979

SUMMARY: A cyclone design model was developed that allows for prediction of emission concentrations of cyclone given inlet dust loading, volume rate of flow, particle size distribution and cyclone dimensions. An example design was presented for grain dust using Texas A&M Long Cone (10-30) cyclones in a series with a high volume, low efficiency cyclone used as a pre-separator. With the cyclone pre-separator, reductions of particulate emissions of 90% were calculated.

American Society of Agricultural Engineers
St. Joseph, Michigan 49085

PREDICTED EFFECTS OF THE USE OF NEW CYCLONE DESIGNS ON AGRICULTURAL PROCESSING PARTICULATE EMISSIONS

Calvin B. Parnell, Jr., and Doug Davis

Introduction

Air pollution-abatement equipment is expensive and does not improve the processing efficiency or increase processing rate. However, various federal (EPA), state and county community air pollution regulations must be met by the agricultural processing facility in order to continue operating. The most common air pollution abatement device for agricultural processing emission is the cyclone collector. It is generally accepted that if the standard "high efficiency" (2D-2D) collector will not meet the applicable community air pollution regulations, bag filters must be used. Current costs of bag filter systems are approximately $4.00 per cfm as compared to less than $0.25 per cfm for cyclone collectors.

Recent surveys by EPA in California and Arizona have resulted in additional pressure being placed on the cotton ginning and oil mill industries to reduce their particulate emissions. An oil mill in California[1] has been able to reduce their particulate emissions significantly by replacing their high efficiency (2D-2D) cyclones with the Texas A&M long-cone (1D-3D) cyclone on their second cut linter exhausts. A private consulting firm measured emission concentrations from their existing standard (2D-2D) cyclone collectors and newly installed A&M long-cone (1D-3D) collectors with the following results:

Standard 2D-2D cyclones	0.027-0.032	grains per standard cubic foot (0.79-0.92 pounds per hour)
Texas A&M (1D-3D) cyclones	0.011-0.012	grains per standard cubic foot ((0.20-0.21 pounds per hour)

---

[1] Private communication with Jack Witz, Engineer, Producers Cotton Oil Mill, Fresno, California.

The Department of Agricultural Engineering initiated research in 1975 on the design of cyclone collectors. This work was sponsored by a grant from the Texas Grain and Feed Association. The hypothesis associated with this research effort was that cyclone collectors designed properly could reduce particulate emissions that would be expected from standard 2D-2D collectors. The benefit of this work would be in those areas where local community air pollution regulations could not be met by standard 2D-2D collectors.

The objective of our cyclone research project was to develop a cyclone design model that could be used to design cyclone collectors to meet community air pollution regulations. This cyclone design model was based on the theoretical design concepts published by Muschelknautz (1970) and Barth (1956). It was validated using experimental data for collection efficiencies of the standard 2D-2D and long-cone (1D-3D) cyclone collectors.

The purpose of this paper is to illustrate the use of this cyclone design model to develop a cyclone collection system that significantly reduces emissions from agricultural processing facilities. The sample design consists of cyclones in series used to abate a dust loading of 300 pounds per hour at a volume rate of flow of 11,000 actual cubic feet per minute (acfm). The inlet loading of 300 pounds per hour would be similar to loadings that could be expected from a 10-bales-per-hour cotton gin unloading separator exhaust processing stripper-harvested cotton (Parnell, 1973). The particle-size distributions used in this sample problem were obtained from grain dust collected at a terminal grain elevator. Dust associated with cotton ginning would most likely have a higher percentage of larger particles. Hence, emission concentrations from this same sample design for cotton gin exhausts would most likely be lower.

$$\frac{300 \text{ LBS/HR}}{11{,}000 \text{ CFM}} = 0.027 \text{ LB/HR, CFM}$$

Procedure

An air-pollution-abatement system consisting of a low-efficiency (large diameter) cyclone functioning as a preseparator for a series of high-efficiency (small diameter) cyclones may provide an effective and inexpensive method of reducing mill and elevator emissions to compliance levels. With the use of the Texas A&M cyclone design model and the application of basic engineering principles, a system can be designed and tested to determine expected emissions before cyclones are fabricated and installed. The following procedure was used:

1. Determine the volume of air and amount of dust the system will be required to handle.

2. After the volume of air to be handled has been determined, the dimensions of the low-efficiency cyclone can be calculated. The Handbook for Cotton Ginners (USDA Handbook No. 203) provides a "cookbook" methodology for the design of large-diameter cyclones.

3. In order to use the cyclone design model, the particle-size distribution of the dust to be collected must be determined. A sieve analysis of the dust yielded the mass median diameter (MMD) and geometrical standard deviation (σ_g) (Lee et al., 1972).

4. A plot was made of the particle-size distribution using the MMD and σ_g on log-probability paper.

5. A convenient range of particle sizes for the distribution was selected. The midpoint of those ranges and the percentage of dust contained in each range were determined.

6. This cyclone design model can predict the emissions from a given cyclone based on several system parameters. These include the dimensions of the cyclone, the quantity and the PSD of the dust to be collected, and the volume and velocity of the air moving through the system. By inputting the data as determined for the large-diameter cyclone, emission concentrations, as well as back pressure and cutoff diameter of the dust, can be obtained. The resulting emission concentration from this cyclone was used for the input dust loading for the bank of high-efficiency cyclones.

7. The final step in the design process was the decision of how many small-diameter cyclones to incorporate into the system. Four 10-30, long-cone cyclones were designed based on an inlet velocity of 3200 FPM. Application of the continuity equation determined the cross-sectional area of the cyclone inlet:

   CFM = Inlet velocity (ft/min) x cross sectional area of inlet (ft^2)

   The barrel diameter (D_C) of the cyclone is a function of the inlet cross-sectional area. This relationship can be described mathematically as:

   cross sectional area(ft^2) = $D_C^2/8$

   With the diameter (D_C) determined, the rest of the cyclone dimensions can be determined using the relative dimensions shown in Figure 1.

   To estimate emissions from the long-cone cyclones with the cyclone design model, the particle-size distribution for the dust emitted from the large-diameter cyclone must be determined. The particle-size distribution of the grain dust less than 100 μm was conducted using the Model TA Coulter Counter. This PSD in the new ranges was used with the cyclone dimensions, the volume rate of flow and velocity of air as before, and the model predicted the emission levels for each of the high-efficiency cyclones.

Results

Tables 1 through 5 are typical results for the long-cone (10-30) cyclones with varying loadings of 50 to 200 pounds per hour. The particle size (column 1) refers to the median particle size of the range used to calculate emission concentrations. These designs represent the typical approach used to design cyclones for agricultural processing facilities.

Tables 6 and 7 represent a unique cyclone "in series" design (Figure 2). The first cyclone (Table 6) is a high-volume, low-back pressure cyclone used to remove the large particles and decrease the inlet dust concentration inputted to the long-cone collectors. Note the emission concentrations for the

second series of cyclones is 0.075 grains per cubic foot. This should be compared to the emission concentration of 0.203 grains per cubic foot associated with the 75 pounds per hour loading (Table 2) which would be the equivalent design configuration without a preseparator cyclone. The reduction in emission concentrations was approximately 90 percent when cyclones were used in series.

Conclusions

This cyclone design model can be a very useful tool in designing cyclones to meet community air-pollution standards. It provides the means whereby emission concentrations can be estimated prior to installation and testing. A number of cyclone configurations can be compared in the design phase to obtain the system that will satisfy the community air-pollution standards provided the dust loading, particle-size distribution and volume rate of flow is known.

This model provides an opportunity for the agricultural processing industry to meet more rigid air-pollution standards with cyclone collectors when heretofore bag filters would have been required. Although the use of a high-volume, low-efficiency cyclone in series with high-efficiency cyclones require more energy than the standard cyclone design approach, the cost of this system should be significantly less than bag filter systems requiring $4.00 per cfm.

REFERENCES

1. Lee, R. E. and S. Goransen. 1972. National air surveillance cascade impactor network. I. Size distribution measurements of suspended particulate matter in air. Environmental Science and Technology. 6(12):1019-1024.

2. Matlock, S. W., L. R. Wiederhold, Jr. and C. B. Parnell, Jr. 1976. Particle sizing of dust found in cottonseed oil mills. Transactions of the ASAE. 19(5):970-976.

3. Moore, V. P. and E. A. Harrell. 1964. Handbook for cotton ginners. Agricultural Handbook #260. ARS. USDA. pp. 83-84.

4. Muschelknautz, D. 1970. Design of cyclone separators in the engineering practice. Staub-Reinhalt. Luft. 30(5):1-12.

5. Parnell, C. B. and R. V. Baker. 1973. Particulate emissions of a cotton gin in the Texas stripper area. USDA, Production Research Report No.149, 18 p.

TABLE 4

32 INCH DIAMETER CYCLONE - 150#/hr DUST LOADING

INLET VELOCITY - 3200 FPM

OVERALL EFFICIENCY - 81.22

BACK PRESSURE - 6.32 IN. OF WATER

PARTICLE SIZE (MICRONS)	MASS LOADING IN (mg/m^3)	FRACTIONAL EFFICIENCY	MASS LOADING OUT (mg/m^3)	(gr/ft^3)
2.26	52.68	0.000	52.68	0.023
2.85	79.02	0.025	77.01	0.034
3.58	121.17	0.073	112.37	0.049
4.52	142.24	0.150	120.89	0.053
5.70	189.66	0.265	139.47	0.061
7.18	200.19	0.419	116.27	0.051
9.04	389.85	0.606	153.42	0.067
11.39	611.12	0.800	122.32	0.053
14.35	1022.05	0.947	54.30	0.024
18.10	964.10	0.996	4.02	0.002
22.80	600.58	1.000	0.00	0.000
28.70	426.73	1.000	0.00	0.000
36.15	273.95	1.000	0.00	0.000

SUM IN = 5073.36 SUM OUT = 952.75 SUM OUT = 0.416

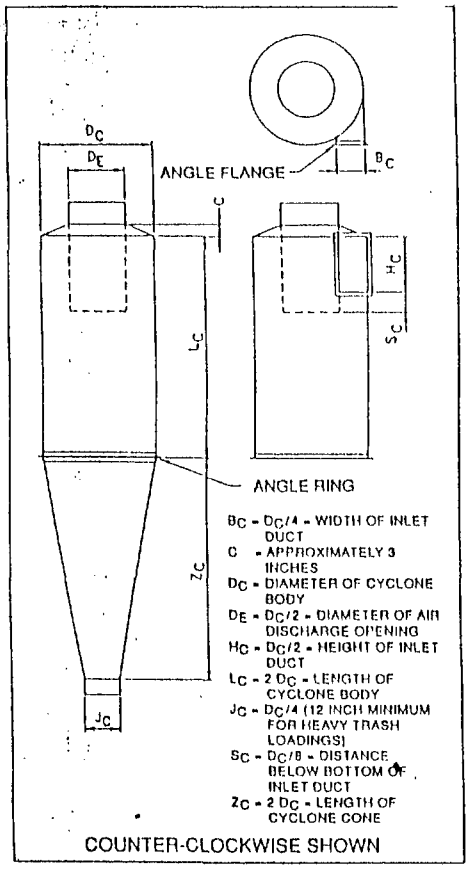


Figure 2: Dimensions of a 2D2D cyclone.

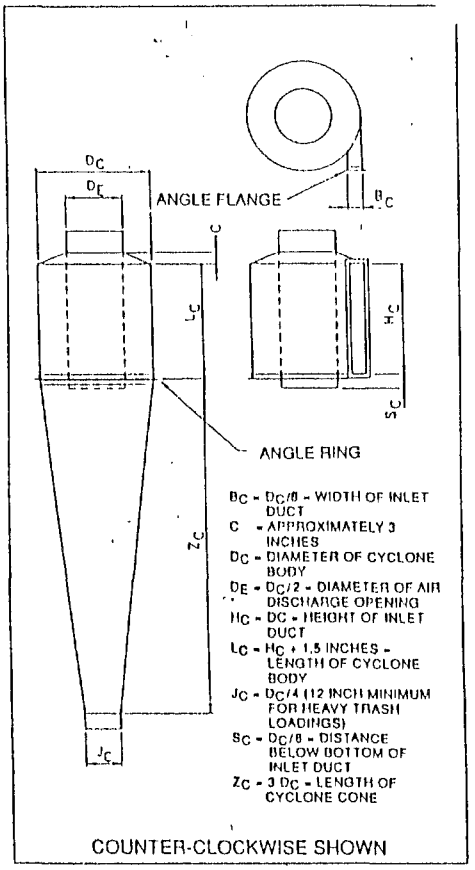


Figure 3: Dimensions of a 1D3D cyclone.

Air volume	Single		Double		Triple		Quadruple	
	dia.	height	dia.	height	dia.	height	dia.	height
ft³/min	in.	ft.	in.	ft.	in.	ft.	in.	ft.
1500	24	9	--	--	--	--	--	--
2000	26	10	--	--	--	--	--	--
2500	30	11	22	8	--	--	--	--
3000	32	12	24	9	--	--	--	--
3500	36	13	26	10	20	8	--	--
4000	38	14	26	10	22	8	--	--
4500	40	14	28	10	24	9	20	8
5000	42	15	30	11	24	9	22	8
5500	44	16	32	12	26	10	22	8
6000	46	16	32	12	26	10	24	9
7000	--	--	36	13	28	10	26	10
8000	--	--	38	14	30	11	26	10
9000	--	--	40	14	32	12	28	10
10000	--	--	42	15	34	12	30	11
11000	--	--	44	16	36	13	32	12
12000	--	--	46	16	38	14	32	12
14000	--	--	--	--	40	14	36	13
16000	--	--	--	--	44	16	38	14
18000	--	--	--	--	46	16	40	14
20000	--	--	--	--	--	--	42	15
22000	--	--	--	--	--	--	44	16
24000	--	--	--	--	--	--	46	16

*Table 2 Recommended 1D3D cyclone arrangements**

**Inlet air velocity = 3,200 ft/min. Cyclone diameters are rounded to the nearest 2 inches.*

Are Your Cyclones Correctly Sized?

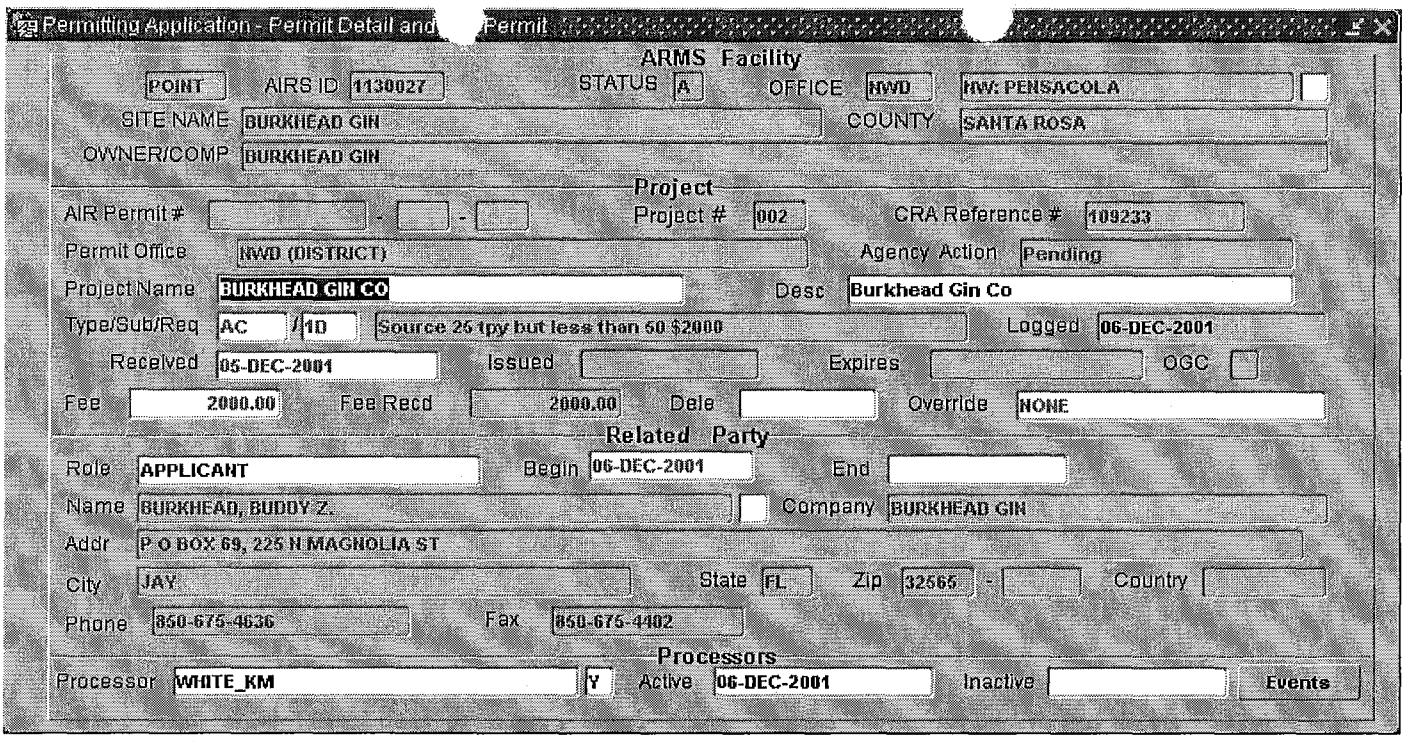
Now that you know the pipe size, air flow, and cyclone type and size, you can determine if your cyclones are correctly sized. The following example will make things clearer. Suppose that you have a 24" pipe carrying the exhaust from an incline cleaner, and that this exhaust discharges into a triple, 40" 1D3D setup. Also assume that the gin is located at 4,000 ft. altitude. Using the pitot tube and manometer, you measure a velocity pressure of 1.2" of water in the 24" pipe and the air temperature is 40°F. From Table 1, a 24" pipe having a velocity pressure of 1.2" of water is carrying 12,561 ft³/min of air. After correcting for temperature (0.971 at 40°F) and altitude (1.075 at 4000 ft above sea level), your pipe is actually carrying 13,111 (12,561 x 0.971 x 1.075 = 13,311) ft³/min of air. Table 2 shows the recommended cyclone arrangements as a function of total air flow. You can see that a triple, 40", 1D3D setup can handle up to 14,000 ft³/min of air and would be a recommended arrangement for handling 13,111 ft³/min of air; therefore, your cyclones have been sized correctly and you need only be concerned with quality of construction and maintenance. Since many of you are probably still using 2D2D cyclones in your gin, Table 3 shows the recommended cyclone arrangements for 2D2Ds.

For those of you interested in how the engineer decided that three, 40" cyclones were an acceptable design, or for that matter, would like to design your

Operation and Maintenance Plan

Prior to the ginning season, facility is started and gone over thoroughly to identify and correct any problems.

During ginning season, weekly check of cyclones and blow pipes for integrity and proper operation will be conducted. Any problems will be corrected as they are found.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AIRS ID 1130027
STATUS A
OFFICE NWD
NW: PENSACOLA
SITE NAME BURKHEAD GIN
COUNTY SANTA ROSA
OWNER/COMP BURKHEAD GIN
Project
AIR Permit #
Project # 002
CRA Reference # 109233
Permit Office NWD (DISTRICT)
Agency Action Pending
Project Name BURKHEAD GIN CO
Desc Burkhead Gin Co
Type/Sub/Req AC / 1D
Source 25 tpy but less than 50 $2000
Logged 06-DEC-2001
Received 05-DEC-2001
Issued
Expires
OGC
Fee 2000.00
Fee Recd 2000.00
Dele
Override NONE
Related Party
Role APPLICANT
Begin 06-DEC-2001
End
Name BURKHEAD, BUDDY Z.
Company BURKHEAD GIN
Addr P O BOX 69, 225 N MAGNOLIA ST
City JAY
State FL
Zip 32565
Country
Phone 850-675-4636
Fax 850-675-4402
Processors
Processor WHITE_KM
Y
Active 06-DEC-2001
Inactive
Events

Pensacola P.O.C., Inc.

109 South Second Street, Pensacola, FL 32507 Phone: (850) 456-4406
Email: ppoc@bellsouth.net Fax: (850) 456-4426

Environmental Permitting and Testing

4 December 2001

Ms. Sandra F. Veazey
Air Program Administrator
Department of Environmental Protection
160 Governmental Center
Pensacola, FL 32501-5794

RE: **Burkhead Gin Company**
Jay, FL
Construction Application for Air Permit, Non-Title V Source

Dear Ms. Veazey:

2 copies filed electronically

Enclosed please find four copies of a construction Application for Air Permit, Non-Title V Source along with a check payable to DEP for $2,000.00.

If you have any questions, please give us a call.

Sincerely,

Barbara Šviglin

Barbara Šviglin

enclosures

cc: Burkhead Gin
file

Department of
Environmental Protection

Jeb Bush
Governor

Northwest District
160 Governmental Center
Pensacola, Florida 32501-5794

David B. Struhs
Secretary

PERMIT DATA FORM DATE: Dec 5, 2001

PROJECT SOURCE NAME Burkhead Lin Co.

TYPE CODE AC. SUBCODE ID.

CORRECT FEE 2,000.

AMOUNT RECEIVED 2,000.

AMOUNT REFUND _____.

PROCESSOR Kevin White

COMMENTS:

PERMIT APPLICATION SITE NUMBER 1130027-002-AC.

WAER SITE NUMBER _____.

ARMS SITE NUMBER _____.

CASH RECEIVING RECEIPT NUMBER 368368.

CHECK REMITTED BY: Burkhead Lin Co.

CHECK# 6730

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AREA: NWD_______        Cash Receiving Application                    CRAF006A
                      Collection Point Log Remittance      Tot: ______$2,000.00
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| SYS$RCPT: 368368__ PNR: _______ Check #: 6730_____ Amount: _____2,000.00      |
| SSN/FEI#: _________              Name: BURKHEAD_GIN_CO_____________           |
|    First: _____________________ Middle: _____ Title:_______ Suf: _____       |
| Address1: P_O_BOX_69_____________________________ Short Comments:             |
| Address2: _____________________________________ 1130027002_-_MBC_________    |
|     City: JAY_____________________ ST: FL  Zip: 32565-____ Country: _________|
+-------------------------------------------------------------------------------+
+--------------------------> P A Y M E N T (S) <-------------------------------+
|          Distr                                                          S     |
|          CL     Object                    Payment                 Applic/   T |
| SYS$PAYT Area.. Code/Description.....: Amount........ Reference#      Fund  A |
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 COMMIT FREQUENTLY                    ______$2,000.00  Payment total
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Department of Environmental Protection

Jeb Bush
Governor

Northwest District
160 Government Center
Pensacola, Florida 32501-5794

David B. Struhs
Secretary

Telephone Conversation Record

Company:	Burkhead Gin		
Talked With:	Mr. Burk HEAD	**Title:**	Owner
Date:	10/23/01	**Time:**	
Recorded By:	K.White	**AIRS ID No.:**	1130027

Subject: Discussion of Recent Cotton Production and Permit Requirements

Notes: 850/675-4636

I called Mr. Burk on Mr. Andy Allen's request to gather information concerning the Burkhead Gin's current operations and to determine what needs to be done about the facility's current permit deficiencies. Mr. Burk denoted that he could process much more cotton than in the past (10 years ago) due to the industry change to a modular feed rather than wagon feed. He said that Mr. Jack Priest helped him get his initial permit application in line to obtain his current permit but it has not been changed since. In the past the facility was required to have a suck pipe and operator to remove the cotton from the wagons. Now days the facility uses modular feeders to feed entire modules of cotton (steady flow of cotton). He also explained that with the new BT Cotton (cleaner cotton, less trash and seeds) cotton is processes much faster than in the past. Mr. Burk denoted that the on a best case scenario the gin could produce 32 bales/hour or 16,000 lbs/hour. He also said that the facility had only been producing about 20,000 bales/year but could most likely produce about 25,000 bales/year (if the permit needed to be modified with an AC). He denoted that he wanted to do what ever needed to be done to get into compliance.