Enessco INT Stickies/Wax Removal for Deink Paper Grades

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AGENDA

- What, Where and How's of Enessco
- Cost of Stickies to your mill
- ENESSCO Deinking Comparison
- Case Histories
- Trial Proposal/Discussion

What is Enessco INT

- 100% Active Dry Powder Product
- Available in 2.27 or 22.7 kg repulpable bags
- Exclusive & Patented by Enessco Int.
- Blend of Wetting Agents & Inorganic Polymers fed to the recycled fiber pulper.
- Deink dosage rates of approximately 0.6 Kg. per ton of recycled furnish in the pulper

What is Enessco INT ?

- Application Concept- To release contaminants quickly from fibers and increase the efficiency of Contaminant Removal Equipment and Water Clarification, while Minimizing Fiber Loss

Where does Enessco work

- Any recycled paper mill where contaminants have a path out of the process.
  - Pulper ragger/tail
  - Turbo Separator
  - Fine screen rejects
  - Lightweight cleaners
  - Clarifiers
  - Washing & Flotation Cells

How does Enessco work

- Enessco's power begins in the Pulper
  - Batch or Continuous, any pH, any temperature
  - Enessco's Wetting Agents speed up fiber rewet
  - Contaminants do not stick to wet surfaces
  - This keeps the contaminants large for easier and faster removal

How does Enessco work

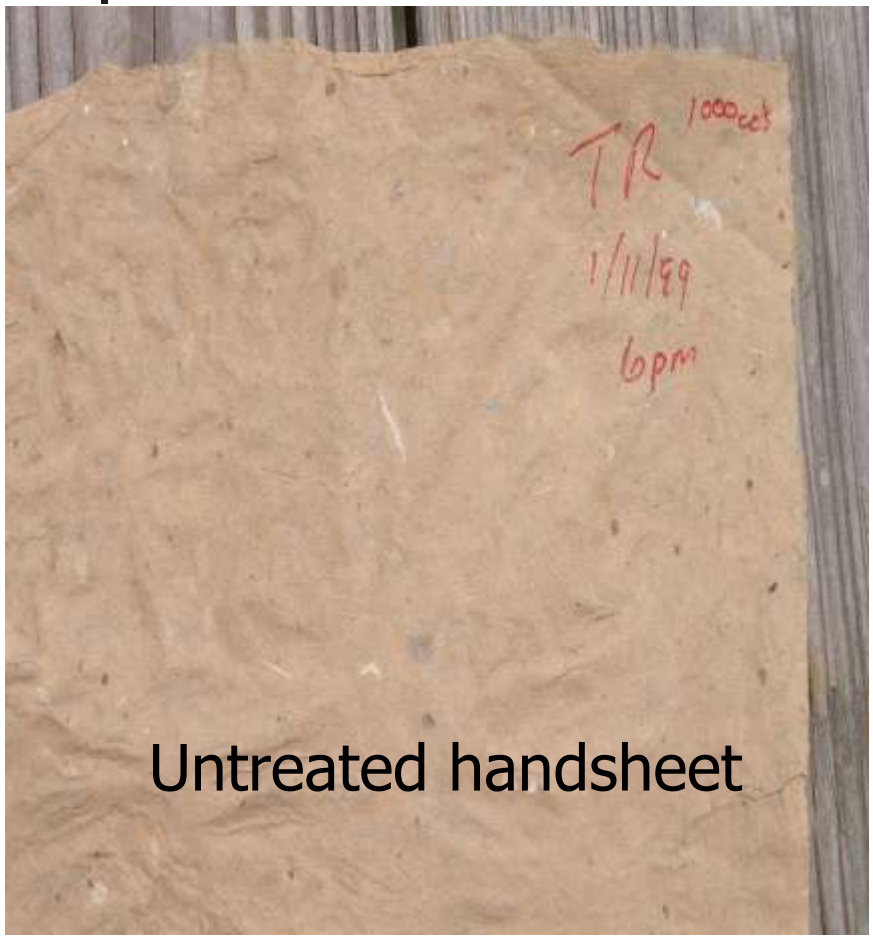
Contaminant removal continues in stock cleaning and conditioning equipment

- Stickies Removal Increased 400-600%

(Screens, Cleaners, Gyro-Cleans, Clarifiers)

- Inorganic phosphate polymer contains hydrophobic and hydrophillic ends that attach to all hydrophobic contaminants and modifies physical properties to allow equipment to better distinguish between fiber and contaminant.

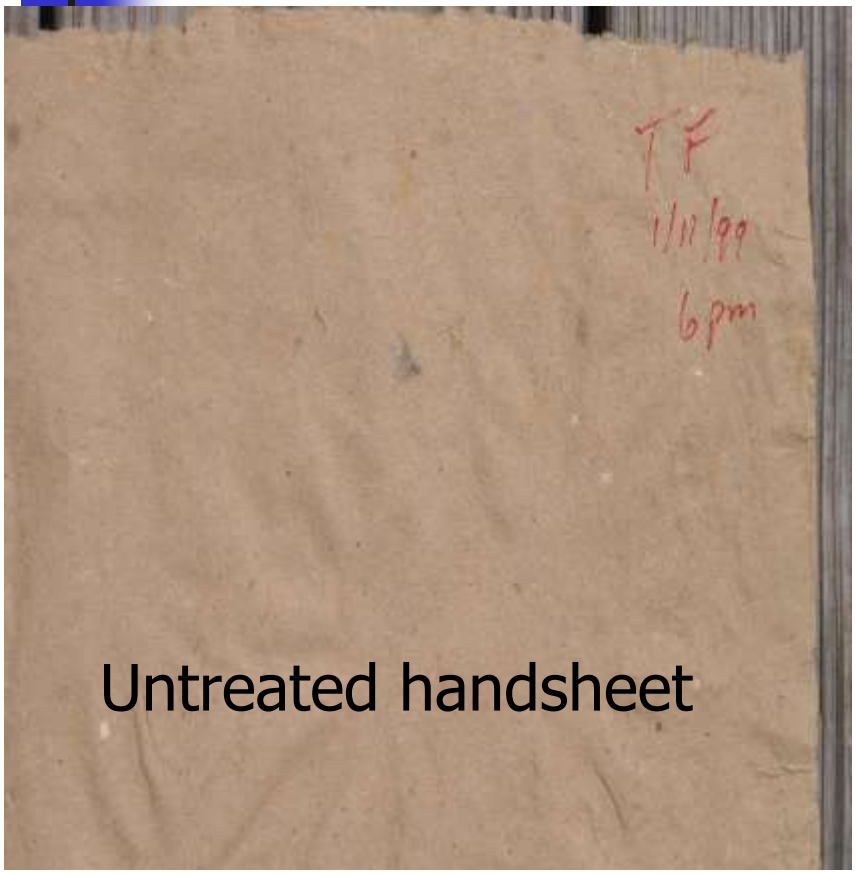
How does Enessco work – Lightweight Cleaner Rejects



Untreated handsheet

Treated handsheet

How does Enessco work – Lightweight Cleaner Feed



Untreated handsheet

Treated handsheet

How does Enessco work – Lightweight Cleaner Accepts

Untreated handsheet

Treated handsheet

How does Enessco work

- Inks are hydrophobic too.
- Enessco “cleans” process water loops.
  - Deink cells
  - Clarifiers
- Maintaining high quality Process Water is essential for maximizing sheet appearance and reducing bleaching costs and side effects.

How does Enessco work

- Enessco's inorganic phosphate by it's chemical nature cleans equipment surfaces.
  - Cleaner equipment works better!
  - Initial clean-up

What is the cost of Stickies ?
Five areas where your money is lost

1. Lost production
2. Poor sheet quality
3. Low fiber yield
4. High bleaching & chemical costs
5. Converting problems

What is the cost of Stickies ?

1. Lost Production

- Deposits: Screens, Headbox, Forming Fabric, Press Felts, Dryer Section, Doctor Blades, Rolls and Sheet.

- Cost = Sheet Breaks, Downtime, Poor Fabric Performance, Low Fabric Life, Poor Profiles

What is the cost of Stickies ?

2. Poor Sheet Quality

- Spots, Holes, High Stickies, High Dirt Counts.

- Cost = Downgrades, Rejected paper, Customer complaint adjustments, Process Adjustments, Grade Changes, Virgin Fiber Substitution, Lower Speeds.

What is the cost of Stickies ?

3. Low Fiber Yield

- Stock Screening and Cleaning Reject Rate decisions based on: "acceptable yield" verses "economics".
  - Smaller Screen slots and higher Cleaner reject rates to remove smaller particles, increases the amount of good fiber losses.
- Cost = Fiber, Disposal, Equipment

What is the cost of Stickies ?

4. High bleaching & chemical costs

- Bleaching
- Solvent
- Batchwashing chemicals
- Undesirable chemicals in process water

- Cost = Uneccessary Chemical Costs

What is the cost of Stickies ?

5. Converting problems

- Poor production rates
- Returned Paper and handling
- Extra washups and downtime in printing
- Ink Contamination
  - Printing blanket problems

- Cost = High Operating Expenses

Enessco Deinking Comparison

- Traditional Deink Process
- Traditional Stickies Control
- ENESSCO Design
- ENESSCO Deinking
- ENESSCO INT Stickies/Ink Removal
- ENESSCO PASSIVATION
- ENESSCO INT BENEFITS

Traditional Deink Process

Chemicals

- Caustic ($0-$4/T)
- Bleach ($2.00-$7/T)
- Silicate(.50-$1.50/T)
- Chelant($0.20-$1/T)
- Wash/Dis./Floatation Aid ($0-$4.00/T)
- Total=**($2.50-$17.50/T)**

Process Conditions

- pH = 5-11.5
- Temperature = Ambient - 160 F
- Washing/Floatation
- Variable Repulping Consistency & Time

Traditional Stickies Control

STOCK TREATMENT

- POLYMER
  - Detac
  - DiMDAC
  - P.E.I.
- Talc
- Diatomatious Earth
- Surfactants

MACHINE

- Retention Aid
- Wire Passivation
- Felt Treatment
  - Solvent, Caustic, or/and Acid Wash
  - Blends with Disp. & Surfactants

ENESSCO Design

- Product designed to More Quickly & Efficiently Liberate Stickies/Ink from the Fiber Substrate.
  - This mechanism avoids fiber/stickies bundles and avoids reducing contaminant size.
- Designed to Modify Contaminants in as Large a Size as Possible for Maximum Removal.
  - Screening and Cleaning equipment can easily identify & reject contaminants, while accepting valuable fiber.

ENESSCO Deinking:

- Deinking Mechanisms
  - Mechanical/Surface Active Forces
  - Wetting Agent Package
    - Enhanced Fiber Swelling
    - Ink Release at Ink/Fiber Interface
    - Stabilization of Inks Prevents Re-deposition back on Fiber and Over-Dispersion (washing maintained, but clarification process improved)
  - Inorganic Polymer Package
    - Scavenges Flexo Acrylic Binder, Ink Vehicles

ENESSCO INT Stickies/Ink Removal

PRIMARY MECHANISMS

1. Separate Pulper Stickies as Large Particles
2. Modify WW stickies to improve removal
3. Ink flotation/removal enhancement

PRIMARY RESULTS

1. 2-6 Fold Increase In Rejects = Lower Dirt/Stickies
2. Improved furnish quality = Better Productivity
3. Cleaner process water = Higher Brightness

ENESSCO PASSIVATION

- Stickies Passivation
  - Although dramatically reduced, remaining stickies are Detackified
  - Easier Cleaning of Wire & Felt Depositions
  - Control of Dryer Section & Converting Deposition/Breaks
- Stickies Passivation Mechanism
  - Inorganic Barrier Coating Detackifies Sticky Surfaces
  - Inorganic Barrier Maintains Stickies Control Performance When Dry.

ENESSCO INT BENEFITS

System

- Yield Increase
  - > Removal Stickies/Wax
  - Reduced Fiber Loss
- Higher Quality Pulp
  - Lower Stickies Count
  - Less Micro-Stickies
- Higher Quality White-Water
  - Lower Chemical Use

Machine

- Production up 3-8%
  - Less Breaks,>Speed
  - Higher Strength
- Cleaner HB, Foils, Rolls, and Fabrics
- Chemical Reduction
  - Cleaning Chemicals
  - Bleaching Costs
  - Flotation Aids

CASE HISTORY #1: ATM – Mechanicville, NY

- Tissue, Towel, Napkin & Specialty Grades
- 1800-2200 FPM Machine Speeds
- ENESSCO D 2000 Goals:
  - Reduce Cost of Stickies Control
    - Eliminate Detac
    - Reduce Solvent Used for Cleaning
  - Increase Quality Production
  - Reduce Downgraded/Culled Production
  - Reduce Splices at the Rewinder & Converting

Performance Of ENESSCO

- Overall Program Benefits
  - Production Increased 6%.
  - Downtime Reduced from 68 to 6 min./day
  - Splices were reduced by 70+%.
  - Sheet appearance improved 25-50%.
  - Lower Quality Furnish Use Implemented.
  - Reduced Chemical Cost for Stickies Control.

Chemical Comparison:

Chemical Use Before

- Solvent
- Felt Wash
- Caustic Wash-HB/Foil/Wire
- Detac @ $5.00/Ton

Chemical Use After Enessco INT

- Solvent Eliminated
- 75% Reduction
- 100% Elimination
- Detac Eliminated

Cost Justification of ENESSCO Chemistry

- Machine Operation
  - 6% Production Increase
  - 50% Lower Culls
  - 70% Fewer Splices
  - 90+% Reduced Stickies, Ink, & Ash Deposition
  - ➢ **Program Justification Easily**

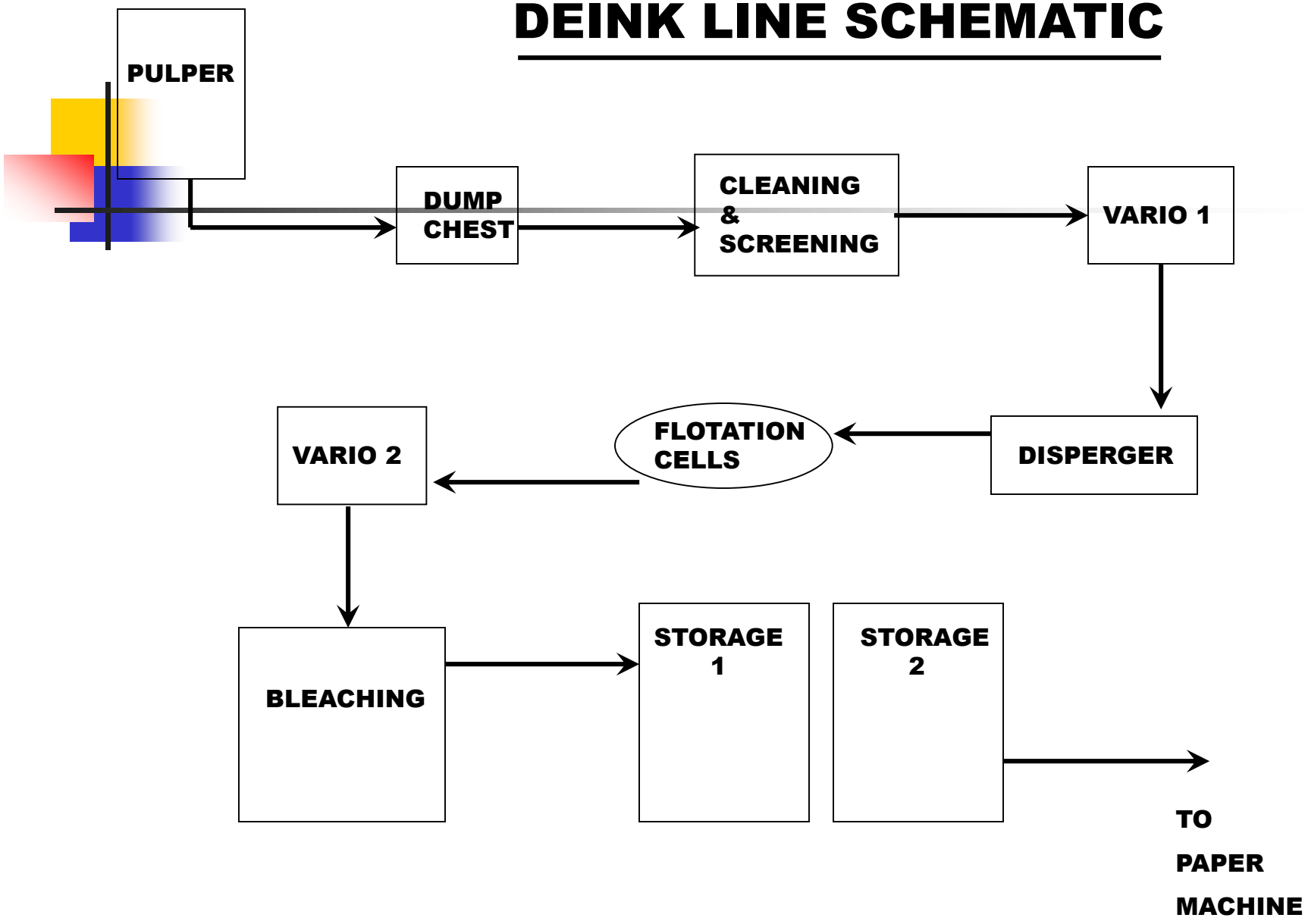
- Operational Savings
  - Savings of $2.00/Treated Ton by replacing Detac with ENESSCO
  - **Reduction of over $2.50/Ton of Solvent & Other Chemicals**

EXCEEDS 3 to 1 ROI.

REFERENCE CASE STUDY #2
Midwest – SCA Tissue

- Twin Wire Machine
  - 160-180 Tons/Day
  - 9-15 Lb. Tissue & Towel Grades, Variable Brightness
  - 3500-5400 fpm
  - Neutral pH
  - 120 Degrees F Temperature
- Deink Plant
  - Variable Quality Sorted MOW & Coated GW Furnish
  - Single Batch Pulper
  - Standard Screening (.006) & Cleaning
  - Washing, Flotation, Disperger

DEINK LINE SCHEMATIC



Production/Quality Issues

- Tissue Machine
  - Fabric Stickies Deposition resulting in Sheet Holes, Breaks & Downtime (3 times/month)
  - Ineffective Stickies Control Chemicals & Use of Cleaning Chemicals
  - Operating Efficiencies should be higher
- Stock Preparation
  - Deink Washer Stickies Deposition

Mill Decision to Use "Chemical Modification" Technology

- The Two Main Reasons for selecting this approach were:
  - "Chemical Modification Product has a history of assisting Stock Preparation Systems to More Effectively Remove Stickies while rejecting less fiber."
  - "Higher quality pulp should not only alleviate stickies deposition, but should maximize sheet quality and machine production."

SCA Tissue-Alsip, IL Phase 1

No Work/No Pay 24-48 Hour Trial

- **Monitor:**
  - Screening Efficiency
  - Cleaner Performance
  - Stickies/Dirt Counts
  - Clarifier Performance

- **No Work/No Pay 24-48 Hour Trial**
- **Benefits**
  - Screening Rejects Removal Improved 2 x
  - Lightweight Cleaners Removal Improved 2-4 x
  - Stickies Reduced
    - 20-50% Improvement
  - Brightness Gain
    - 1-2 Pt. Improvement

SCA Tissue-Alsip, IL Phase 2

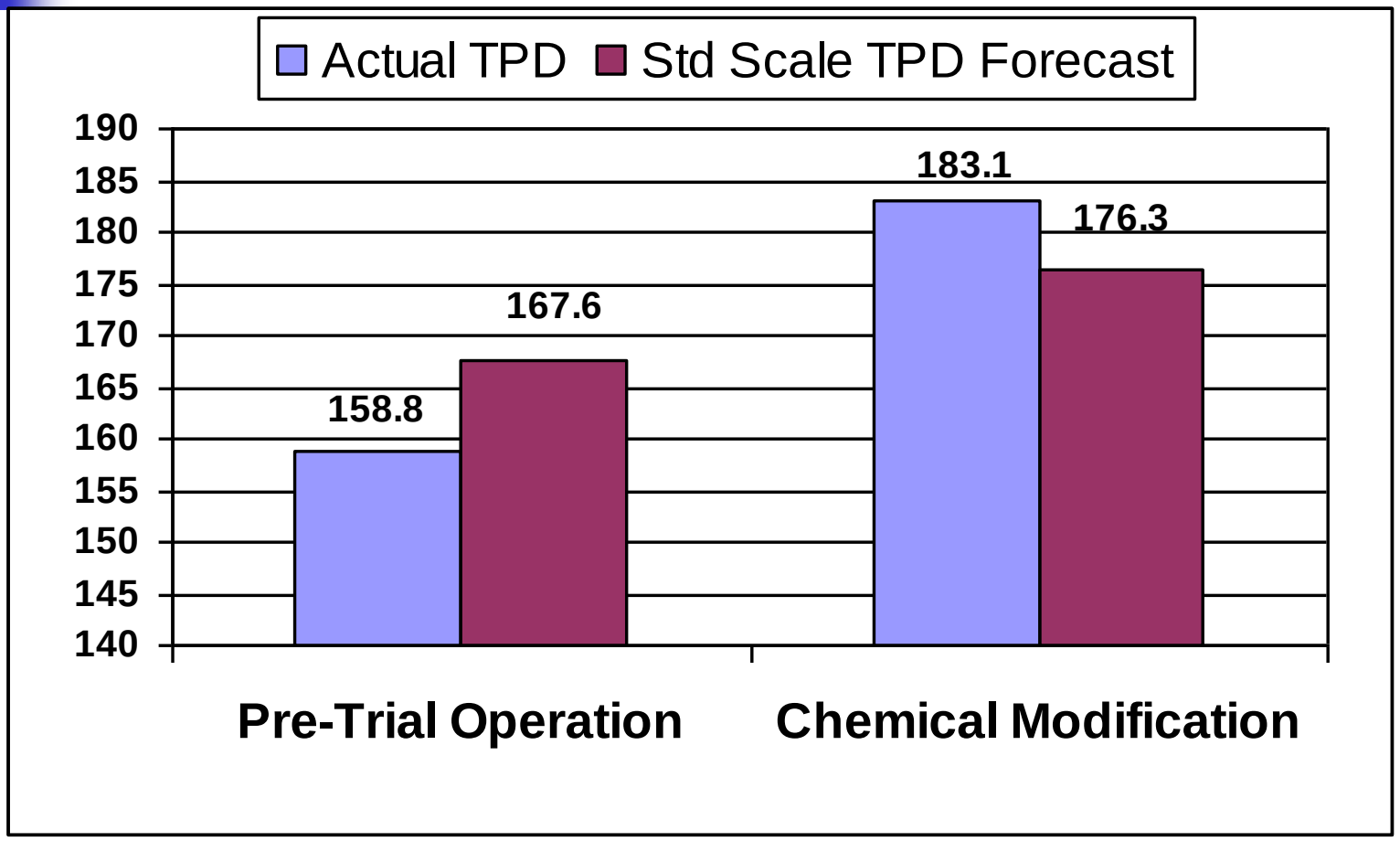
- **4-Week Evaluation**
- **Monitor:**
  - Production (Culled Rolls, Tons, Speed)
  - Quality (Holes, Dirt)
  - Efficiency (Splices, Breaks, Downtime/Wash-Up)
  - Detac, Solvent, & Other Chemical Use

- **4-Week Evaluation**
- **Benefits:**
  - Production
    - Min. 50%<Culled Rolls
    - 3-6%>Incremental Ton
  - Quality
    - Min.30%<Splices,Holes
  - Downtime(50% Red.)
  - Chemical Savings
    - Eliminate Detac
    - 75% Solvent Reduction
    - Lower Bleach & Deink*

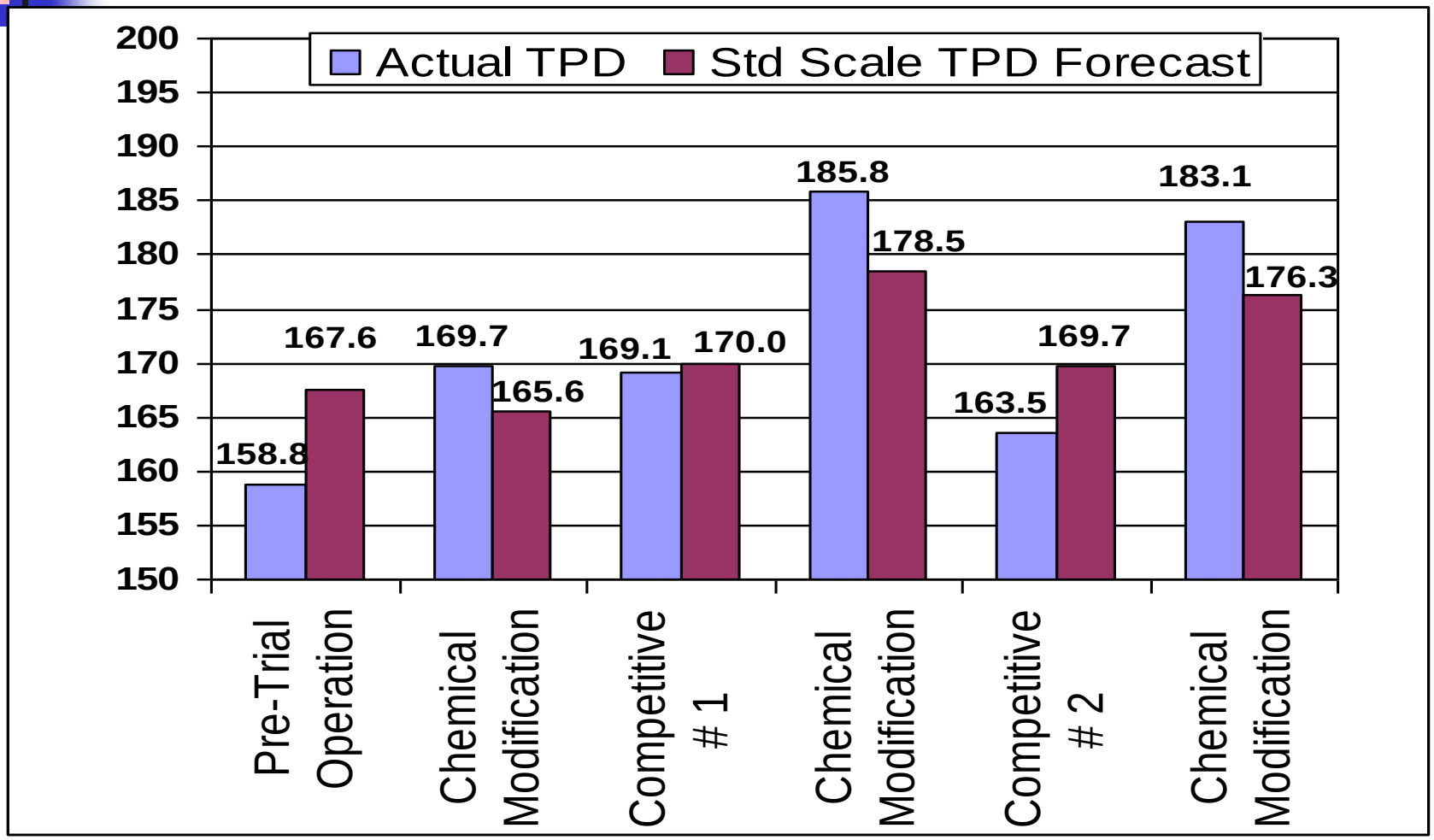
Program Results

- ENESSCO “Chemical Modification” Program generated significant value.
  - Stickies Deposition, Downtime, Chemical Costs and Culled Production was reduced.
  - Machine Speed and Production was increased.
  - Deink Stock Washer Deposition was reduced.
- Competitive Evaluations did not match the performance.

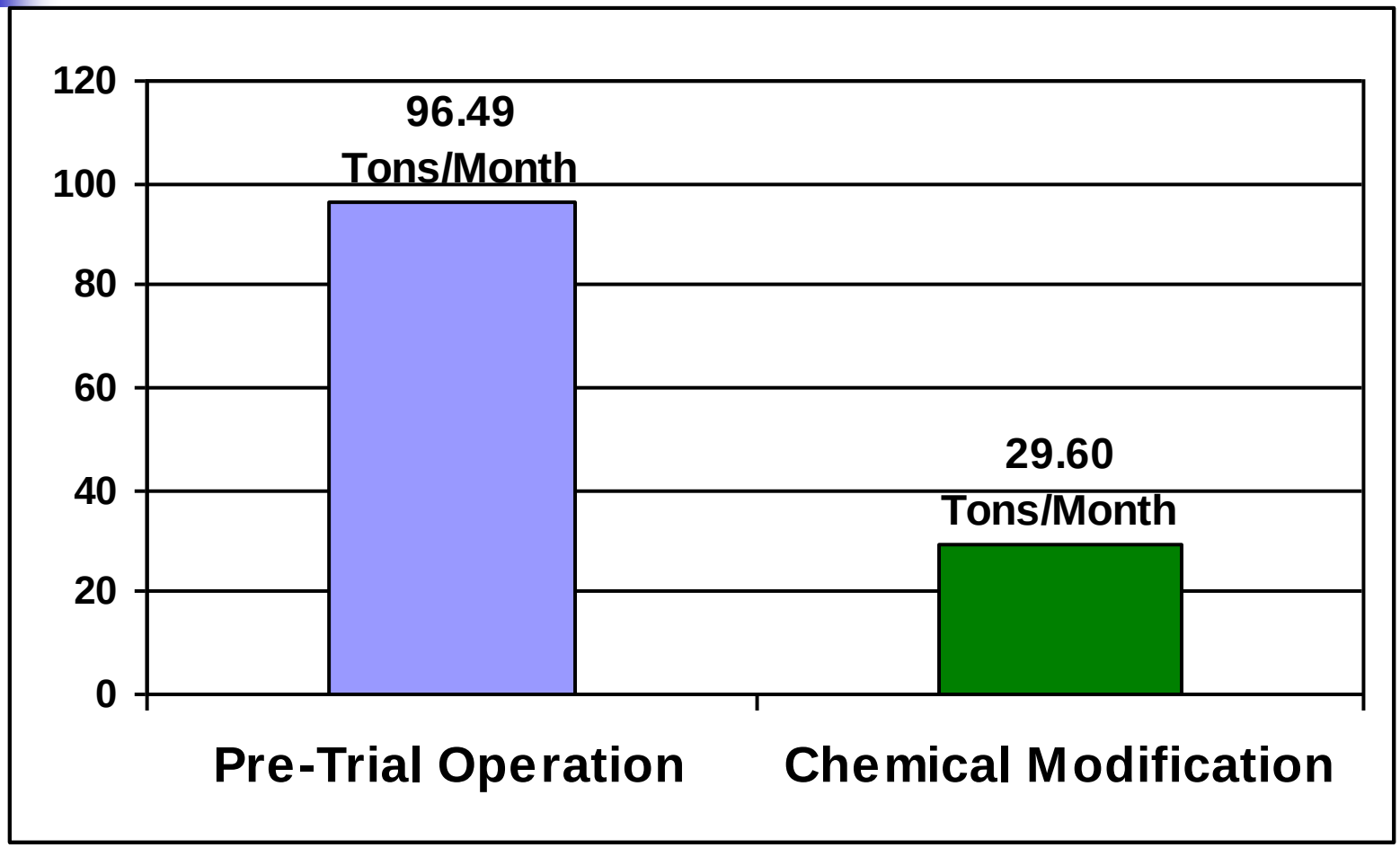
Production Efficiency Comparison



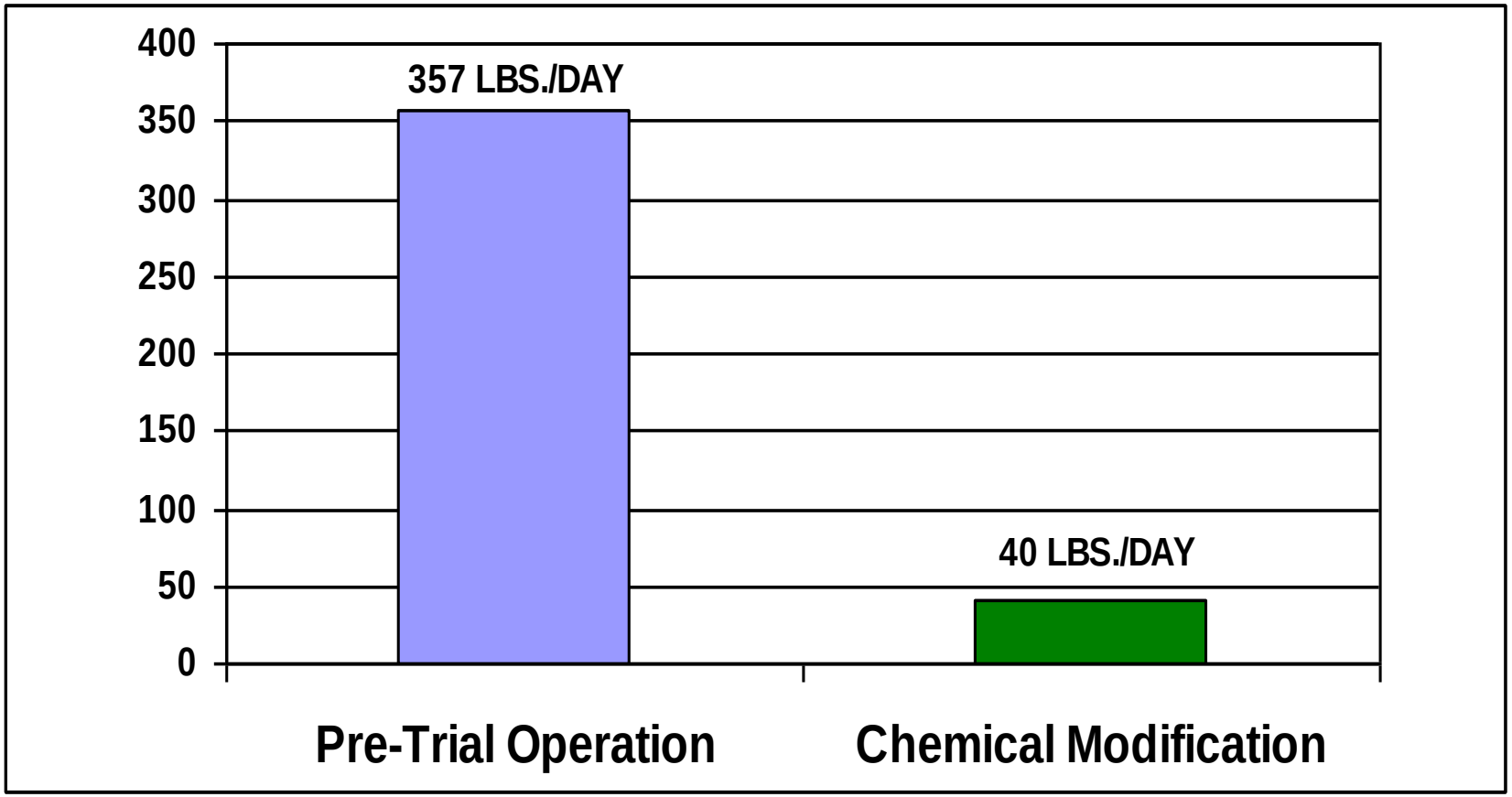
Production Efficiency Comparison



Rejected Production Comparison



Solvent Use Comparison



Final Chemical Comparison:

Chemical Use Before

- Machine Stock Stickies Control Polymer
- Solvent Used for Fabric Cleaning
- Wire Polymer Coating on Fabrics

Chemical Use With Modification Tech.

- Machine Stock Stickies Control Product Eliminated
- 85% Cleaning-Solvent Reduction
- 40% Reduction in Wire Coat Treatment

➢ Easily a 3 to 1 ROI

Bay West Paper – Trial Approach:

PHASE #1

- **Initial 48 Hours**
- **Monitor:**
  - Screening Efficiency
  - Cleaner Performance
  - Stickies/Dirt Count
    - 20-50% Improvement
  - Brightness Gain
    - 1-2 Pt. Improvement

PHASE #1

- **Initial 48 Hours**
- **Benefits:**
  - Screening Rejects Removal Improved 2 x
  - Lightweight Cleaners Removal Improved 2-4 x
  - Stickies Reduced
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  - Brightness Gain
    - 1-2 Pt. Improvement

Bay West – Middletown, OH ENESSCO Value

PHASE #2

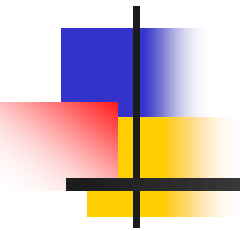
- **4-Week Evaluation**
- **Monitor:**
  - Production (Tons, Speed, etc.)
  - Quality (Holes, Dirt, Brightness, Eric #)
  - Efficiency (Breaks, Splices, Downtime, Washups, etc.)
  - Chemical Use

PHASE #2

- **4-Week Evaluation**
- **Benefits**
  - 50% Reduction in off quality
  - 5-8% > Incremental Production
    - Min.30%<Splices,Holes
  - 50% Lower Downtime
  - 30% < Splices, Holes
  - Chemical Savings: 80% reduction of Solvent, < Bleach & other Chem.

Enessco Trial Proposal

- Stock Prep Review / Questionnaire
- Phase 1: 24–48 hour - No work no Pay
  - Handsheet evaluations
  - Dump Chest, reject streams, finished stock
- Phase 2: 2 – 4 week Evaluation
  - Targeted Issues – Monitor
- Date
- Material Needed



Discussion