



Pollution Prevention Pays in the Food Industry

Presented to:

**Canadian Pollution Prevention
Roundtable
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Working with Water



Water as a Resource

- Water overlooked as a production resource
- Water has a job to do!
 - <Cooling
 - <Washing
 - <Blending
 - <Heating
 - <Rinsing
 - <Carrying
- Maximize and optimize the “work”
 - <Understand exactly how the water does its job
- Understand the water quality required
 - <Product quality the overriding factor

Challenge Traditional Thinking



Pollution Prevention a Key



Treatment at end-of-pipe not cost effective

- **FIRST OPTION: Control at the source**
- Water recycling and reduction has two benefits:
 1. Reduces municipal water charges.
 2. Reduces cost of treatment equipment.
- Innovation creates competitiveness by adopting new technology and/or concepts.



Success Story

Humpty Dumpty Snack Foods

... facing surcharge of \$650,000 yearly with quoted cost of control equipment at \$2.1 million.





Humpty Dumpty



Comprehensive Study

- Altech completed integrated water and wastewater assessment
 - < partially funded by NR Can
 - < emerging opportunities required more detail
- Further Research of water use at Chip Line
 - < partially funded by IRAP
 - < confirmed innovative approach



Humpty Dumpty



- 90% of water used at Chip lines
- 90% of wastewater from Chip lines
- TSS & BOD 10 to 15 times compliance limit
- Water use 300,000 m³/month

Conclusion: Concentrate on Chip lines & minimize water.



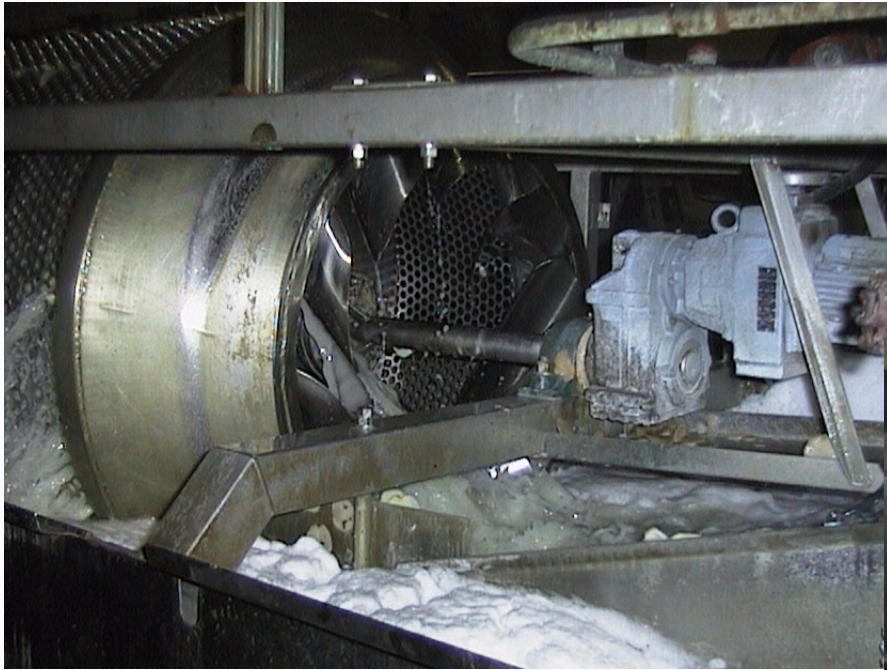
Humpty Dumpty



Analysis

- All water once through use.
- Contaminants of concern: starch & solids.
- Hydraulic flush main “work” or function..
- Dirt and solids at the start of process.
- Slicer main stage where starch released.
 - < Knife slices starch globule





Starch, downstream of slicer.



Common Hydrocyclones

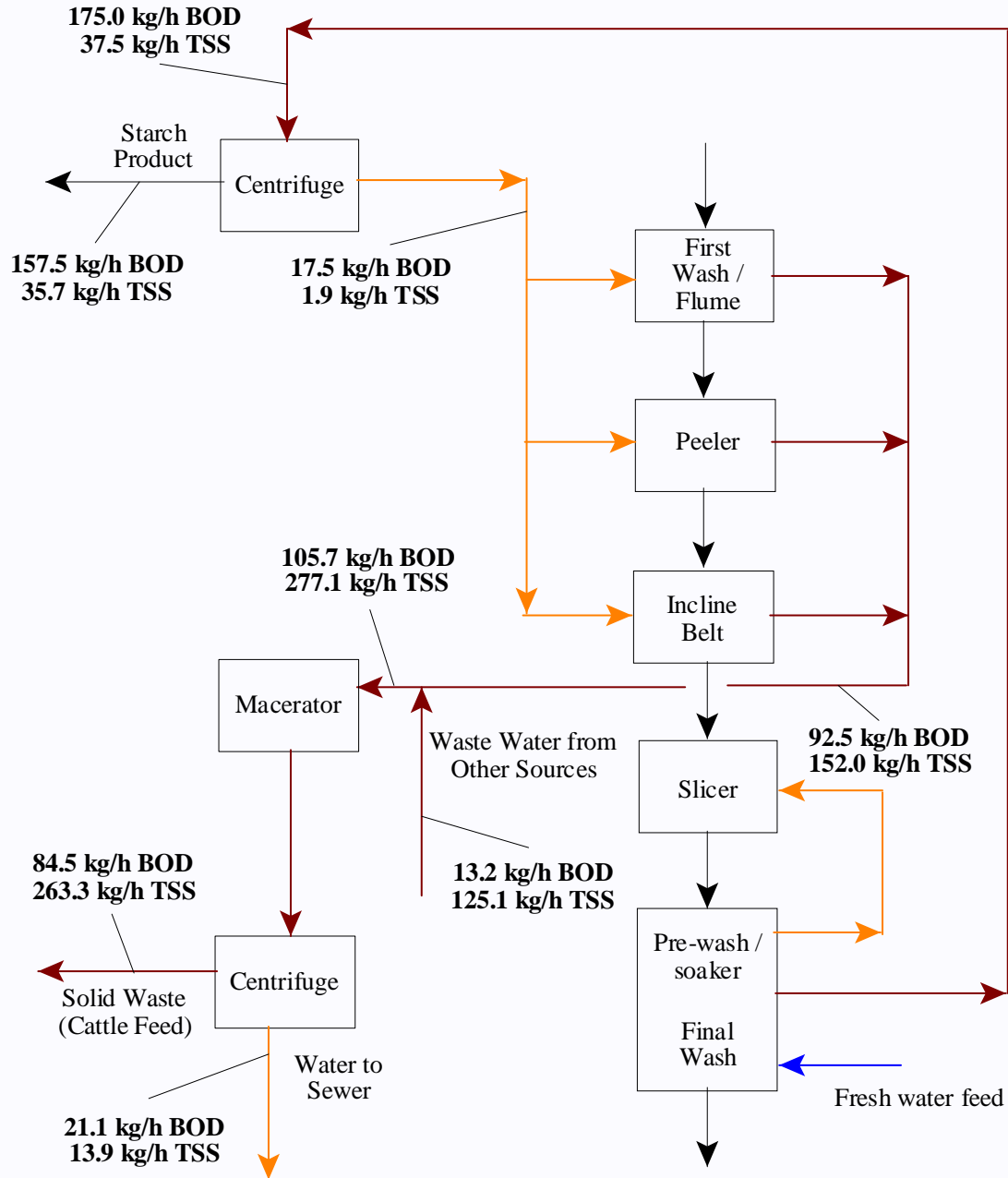


Humpty Dumpty



P2 Strategy

- Baffle water rinses to separate “clean” starch.
 - < Starch after slicer >1% with low TSS
- Starch removal by centrifuge
 - < more reliable than hydrocyclones.
 - < Starch recover at 70% still allows water to be recycled to start of process.







Humpty Dumpty



P2 Strategy

- Fresh water introduced at the last stage of process maintains chip quality
- Recycle water from centrifuge still has 3000ppm starch but 250 ppm TSS
 - <Clean enough for hydraulic flush
- Removes 2 to 3 tonnes per day of starch to effluent.
- Eliminates GHG emissions of 6.9 tonnes methane.



Humpty Dumpty



P2 Pays

- Revenue from starch sale \$90,000/year.
 - < sold as adhesive grade at 60% moisture content for \$0.10 per lb.
 - < dried starch at <10% moisture worth \$0.50 to \$0.60 per lb.
- Recycling of process water at 30% saves \$95,000
- Capital cost of effluent treatment reduced from \$2.1 million to \$800,000.
 - < second centrifuge self-installed by Humpty Dumpty
- Saved sever surcharge of \$650,000.



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