

Metropolitan Sewer District of Greater Cincinnati

Treatment Division

Cost Competitive Strategy

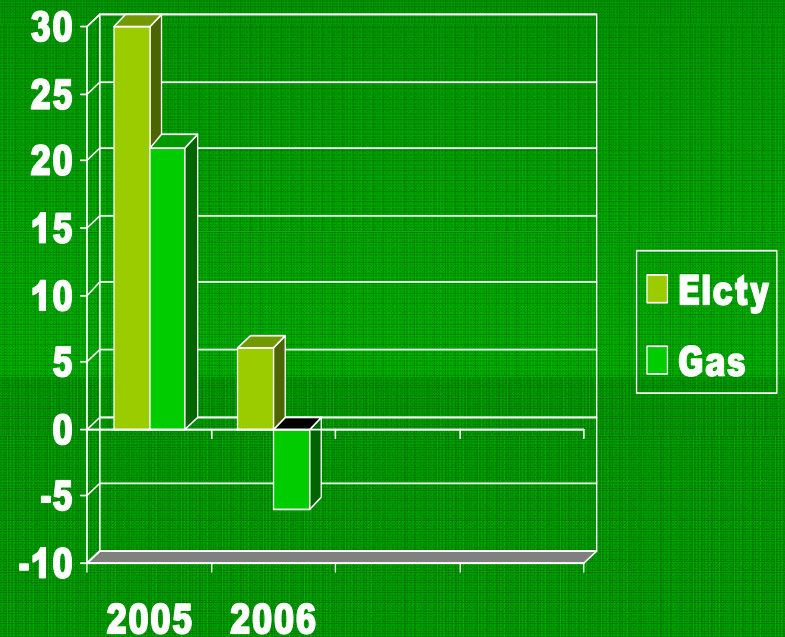
Don Linn

Increasing Cost at MSD

- \$2 Billion Wet Weather Program
- Commodity prices rising fast
 - Energy
 - Chemicals
- The Threat - Managed Competition

Energy Climbing Fast

- Electricity Price Rising
 - 36% in two years
- Natural Gas Rising
 - 100% in five years
 - 15% in two years



Treatment Strategic Plan

Cost & Quality

- *Long Term Strategy*
 - Reliability Centered Maintenance
 - Implement Lean Management Principles
 - Key Performance Indicators
 - SCADA – plant automation
 - Staffing reduction
 - Asset Management

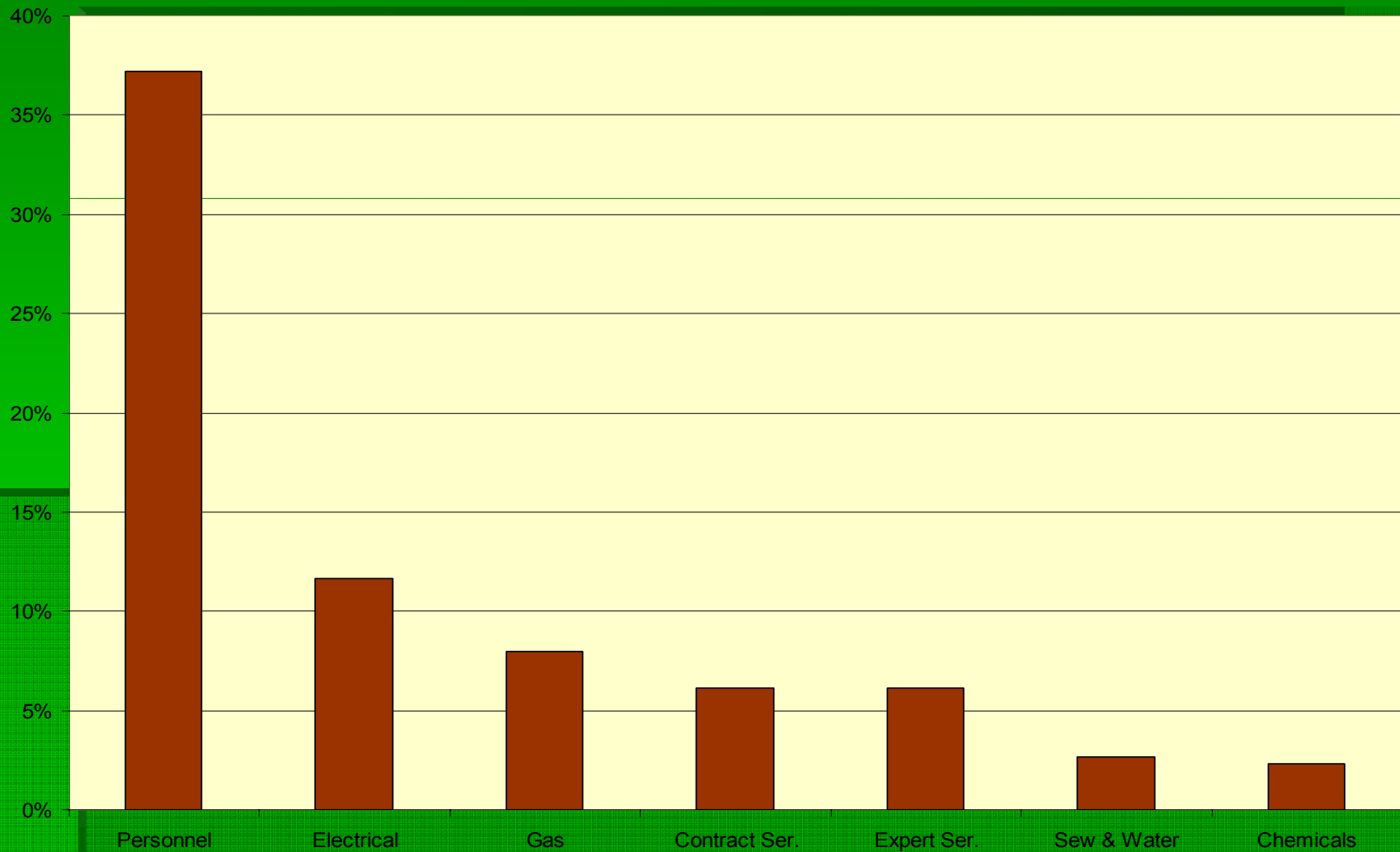
Treatment Strategic Plan

Cost & Quality

- ***Short Term Initiatives***
 - Optimize Value Stream
 - Create Flow
 - Eliminate storage
 - Remove bottlenecks
 - Maximize throughput
 - Implement Key Performance Indicators
 - Reduce staff - attrition

Focused Improvements

Percent of Budget



Division Results

- Staffing Reduced 28% (2000 - 2006)
 - Staff reduced by 8 in 2006 or \$450,000Total annual saving in 2006 is \$7 million
- Energy Savings in 2006
 - Natural gas savings - \$1,230,000.
 - Electrical savings - \$ 480,000
- Reduced Gas & Electric Budgets – 2007

Lean Management Principles

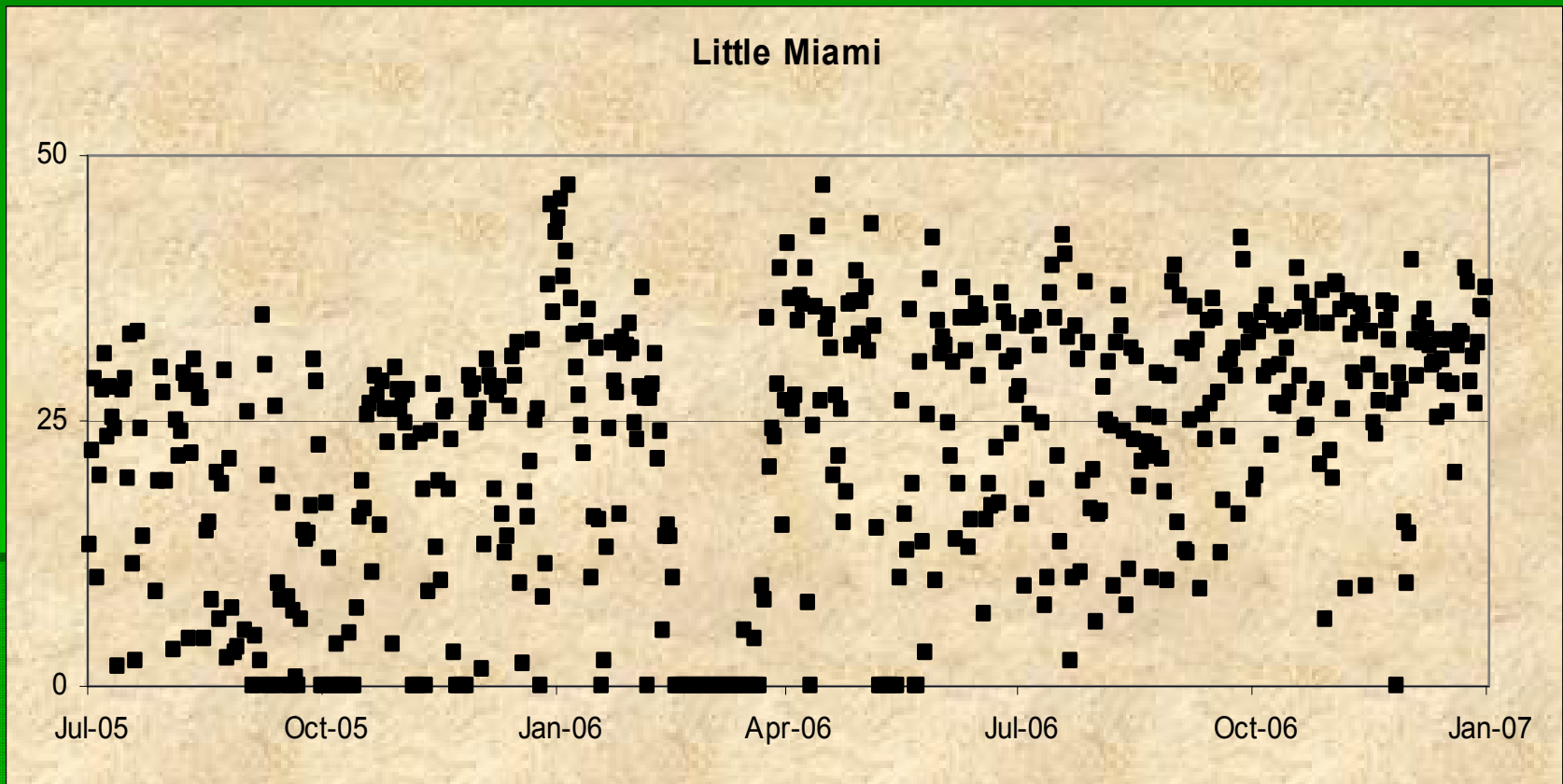
- Team Based Continuous Improvement
- Continuous Flow
- Value Stream Focus
- Visual Controls
 - Key Performance Indicators
- Standard Procedures

Lean Pilot Project

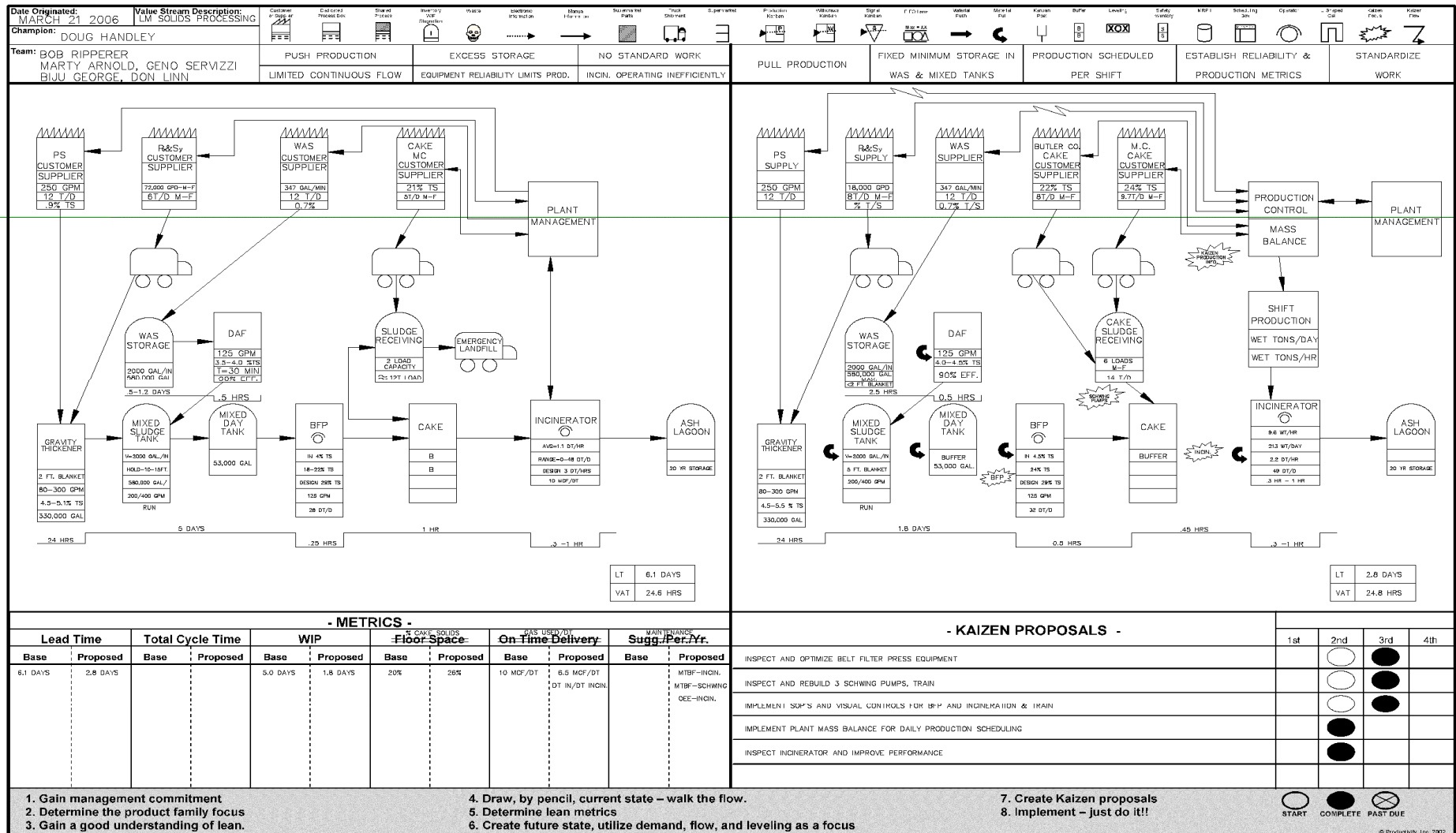
March – June 2006

- Formed team
- Defined Objective
- Mapped Value Stream
 - Create flow
 - Identify waste
- Cause, Effect & Target Results - CEDAC
 - Eliminate Bottlenecks
- Visual Controls
 - Mass Balance
 - Standard procedures
 - Key Performance Indicators

Lean Management Pilot

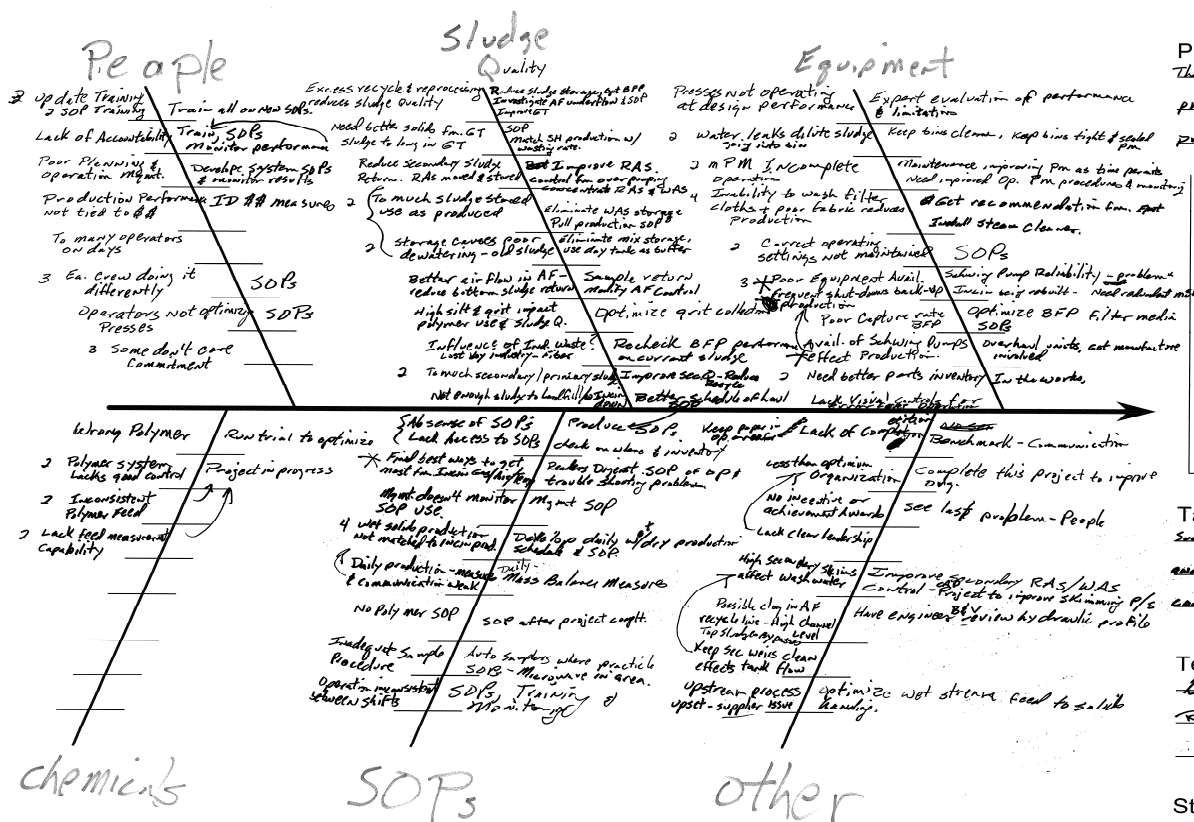


Value Stream Map



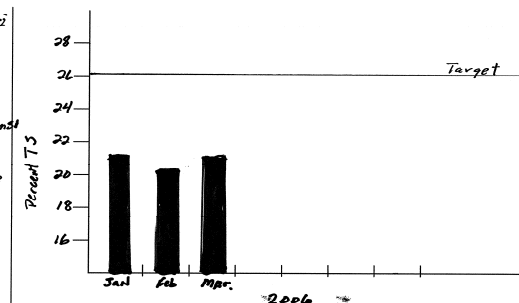
Cause & Effect Diagram

Little Miami Solids Handling Improvement Project
CEDAC® Diagram Chart



Problem Effect

The Belt Press is designed to produce 26% solids, but currently production varies between 18-25% w/average 20%. Why can't we produce 26% solids consistently and manage daily sludge production accurately?



Target Effect

Successfully managing solids production, implementing and monitor SOPs and maintaining overall equipment effectiveness to produce 26% solids consistently and reduce gas use 30% or 3 mcf/dt. This saves \$35/dt

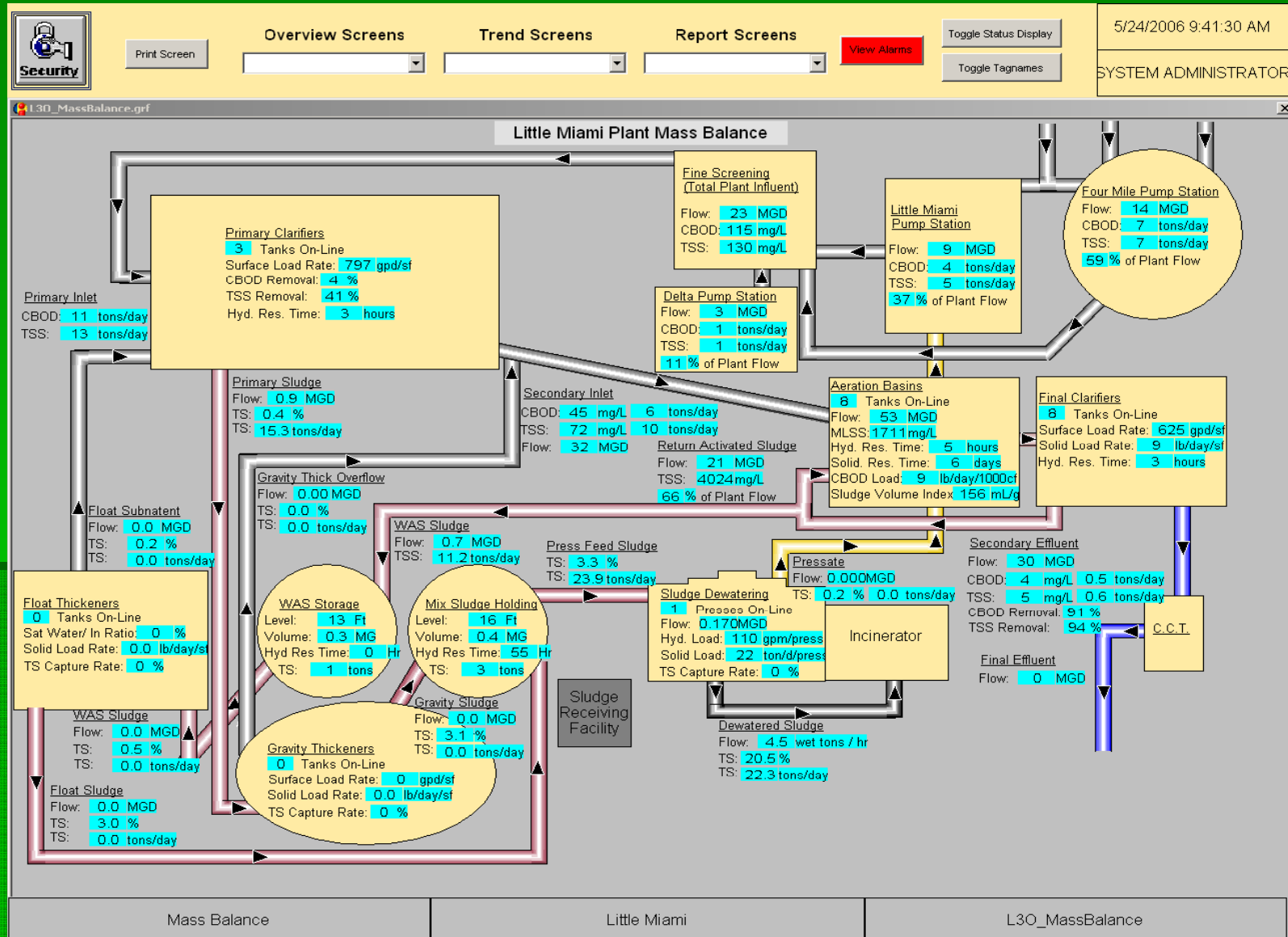
Team Members

Don E. Hally, Don L. Hally
Robert K. Hally, Ray Hally

Start Date April 13, 2006

Target Date


























Visual Control - Mass Balance



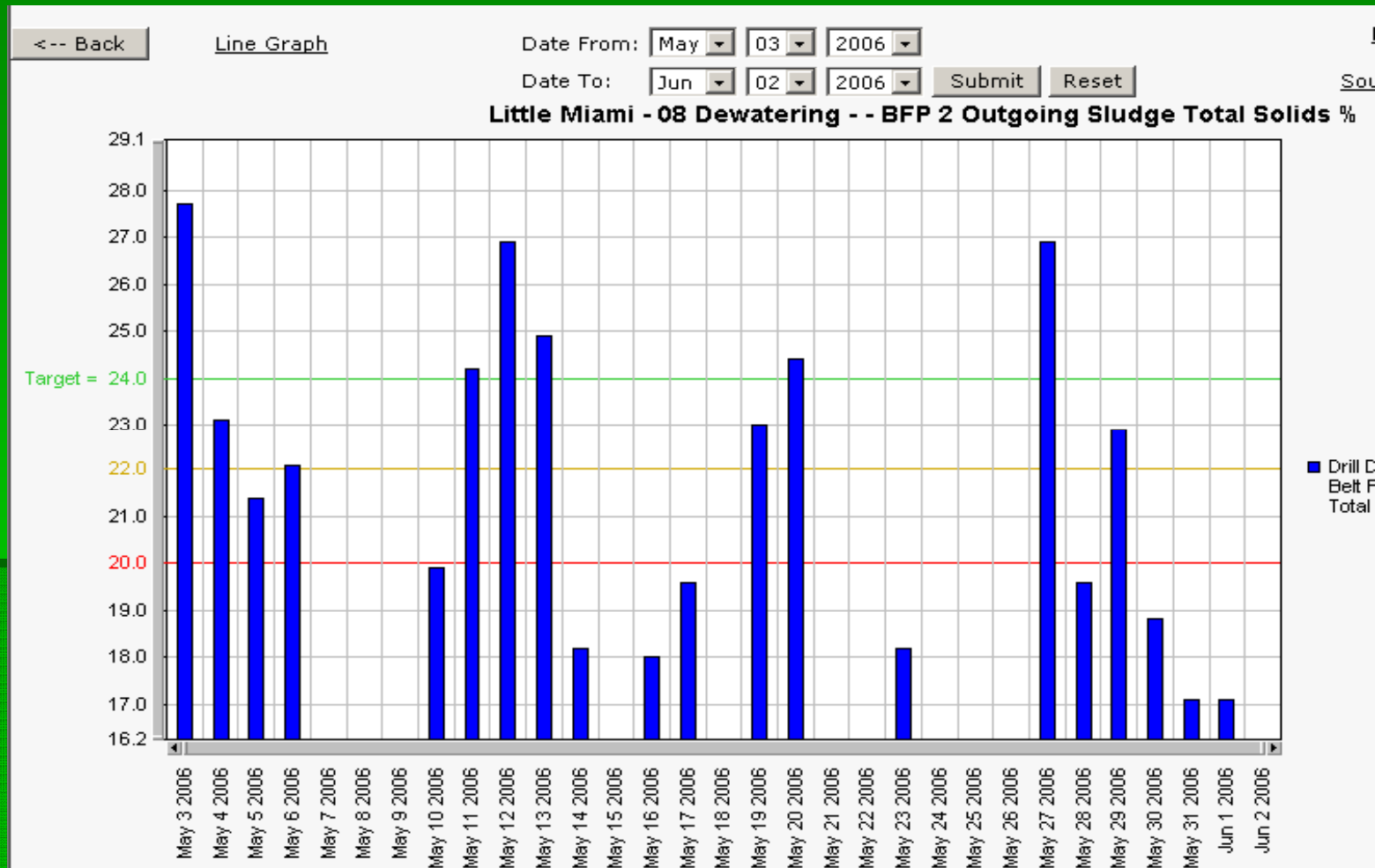
Key Performance Indicators

Indicator Groups

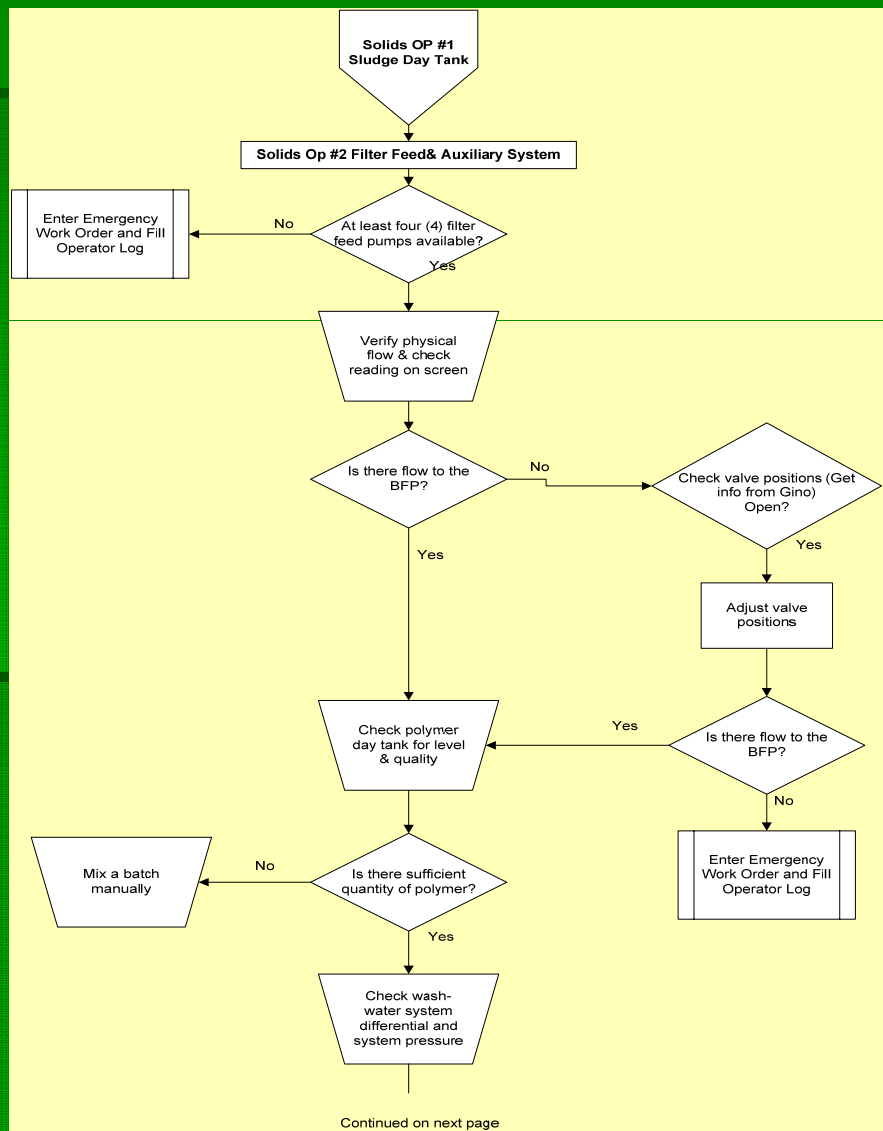
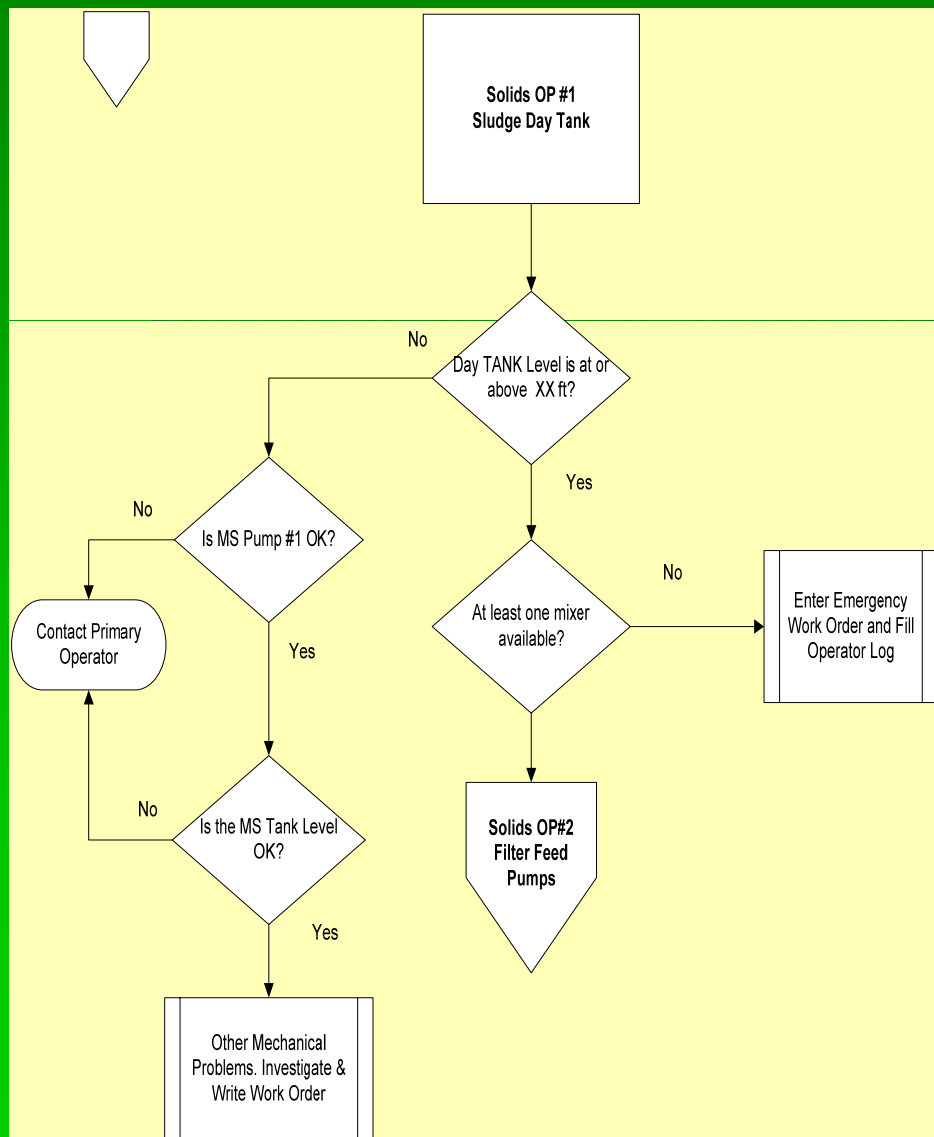
Little Miami Process

-  Little Miami - 05 Secondary - 30 Minute Settling
-  Little Miami - 05 Secondary - Food to Mass Ratio
-  Little Miami - 05 Secondary - MLSS
-  Little Miami - 05 Secondary - SRT
-  Little Miami - 05 Secondary - SVI
-  Little Miami - 05 Secondary D.O.
-  Little Miami - 06a Effluent - CBOD
-  Little Miami - 06a Effluent - CBOD 7 Day - Limit = 40
-  Little Miami - 06a Effluent - CBOD Loading - Limit = 5204
-  Little Miami - 06a Effluent - CBOD Removal - Limit < 85%
-  Little Miami - 06a Effluent - Chlorine Residual
-  Little Miami - 06a Effluent - Fecal
-  Little Miami - 06a Effluent - TSS
-  Little Miami - 06a Effluent - TSS Loading
-  Little Miami - 06a Effluent - TSS Removal
-  Little Miami - 06a Effluent - Turbidity
-  Little Miami - 06a Effluent - TSS 7 Day
-  Little Miami - 07 Thickening - Air Flotation Outgoing TWAS Total Solids %
-  Little Miami - 07 Thickening - MS Tank Level
-  Little Miami - 07 Thickening - WAS Level
-  Little Miami - 08 Dewatering - BFP 1 Outgoing Sludge Total Solids %
-  Little Miami - 08 Dewatering - BFP 2 Outgoing Sludge Total Solids %
-  Little Miami - 08 Dewatering - BFP 3 Outgoing Sludge Total Solids %
-  Little Miami - 08 Dewatering - Polymer Used (Lbs) Per Dry Ton Sludge
-  Little Miami - 09 Incineration - Natural Gas Usage Per Dry Ton Incinerated

Key Performance Indicator



Standard Procedures



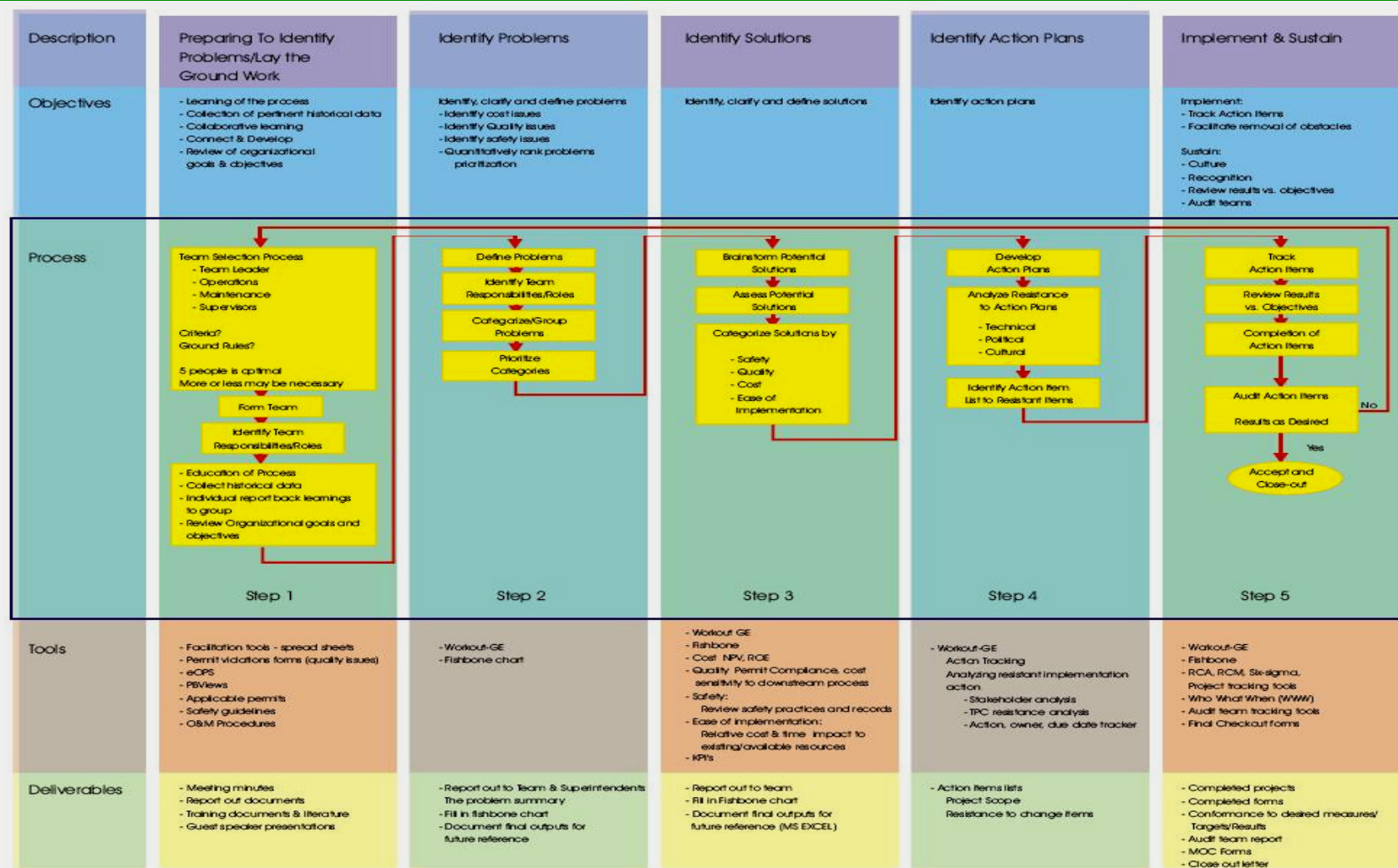
Pilot Project Results

- 40% reduction in natural gas (mcf/dt)
- 23% increase in incinerator throughput
- Daily Key Performance Indicators
- Improved equipment reliability
- Greater O&M focus
- New sludge disposal customer

Improvements In 2007

- Optimize Wet Stream – “Lean”
 - Mill Creek Plant
 - Little Miami Plant
- Reduce Staff
- Improve Equipment Reliability – “Six Sigma”
 - Condition based maintenance
- SCADA Automation
- Asset Management

Improvement Method 2007



Lean Management Resources

- Ohio State University Business School
OSU Lean
 - Productivity Inc.
 - University of Kentucky Industrial Engineering Program
 - Institute for Lean Systems
 - Don Linn – donald.linn@cincinnati-oh.gov
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- Books & Resources
 - Productivity Press

Parting Shot

“It’s not the strongest of the species that survives, nor the most intelligent, but the one most responsive to change.”

Charles Darwin