

An energy saving solution pays big dividends

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MMSD Submersible Mixers

9th Addition

August 1996 –
October 1997

Project Initiation in 2013

Weighing options



Discussions with Manufacturers

Potential
Opportunity



Proposals



- * Major purchase
- * Manufacturer best offering
- * Include trial unit



Installing Trial Mixers



Early winter



Normal winter scum



Moving to “low power” train



Is that a DAF???



Power Comparison

	Brand "A"	Brand "B"	Brand "C"	Brand "X"	Original
HP	2.84	3.00	4.00	2.50	7.50
Stated Power	2.64 kW	2.90 kW	2.54 kW	2.23 kW	
Measured Power	2.03 kW	2.61 kW	2.34 kW	2.11 kW	6.01 kW
Thrust	498 N*		1,122 N	510 N	

* Value provided by supplier, unconfirmed by ISO 21630 test.

Results

- * Four very competitive proposals received
- * All demonstrated
 - * Adequate mixing
 - * Greatly reduced power
 - * Ability to retrofit
- * Ultimately hinged on existing components



INTERNATIONAL
STANDARD

ISO
21630

First edition
2007-08-15

**Pumps — Testing — Submersible mixers
for wastewater and similar applications**



Reference number
ISO 21630:2007(E)

© ISO 2007

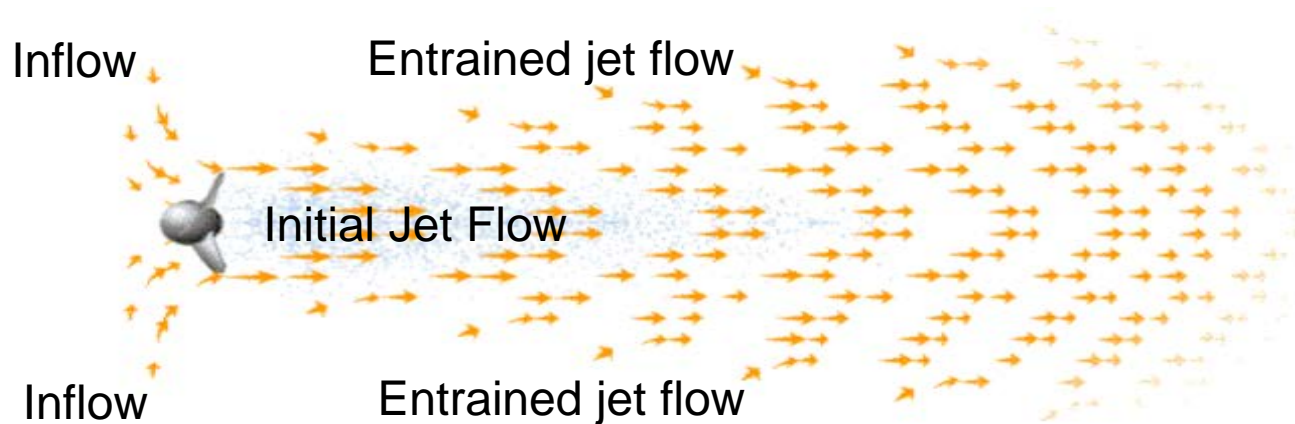
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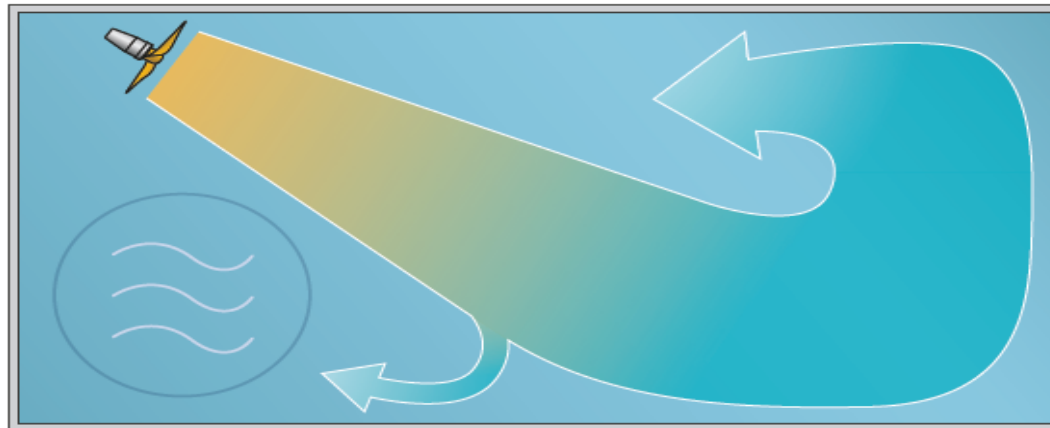
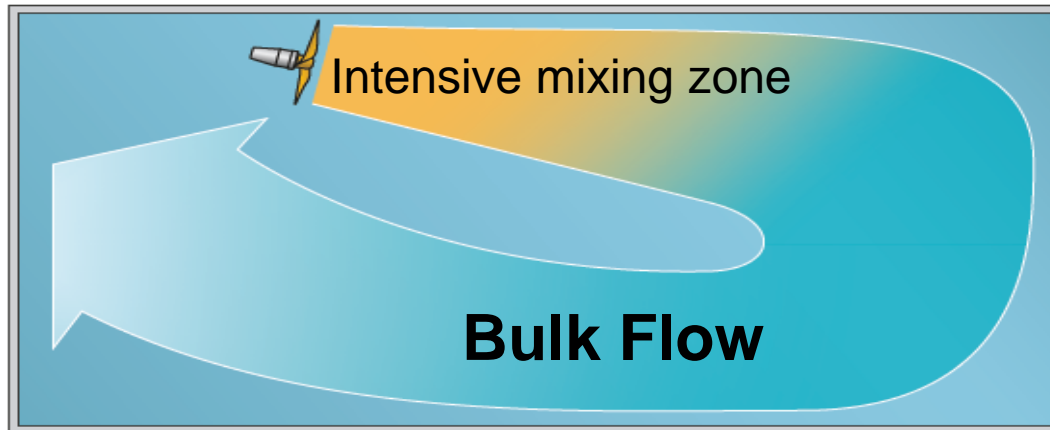
Creating Mixing and Bulk Flow

Many flows, one source

- Inflow
- Outflow, better known as primary flow
- Jet: initial jet and entrained flow
- Bulk Flow

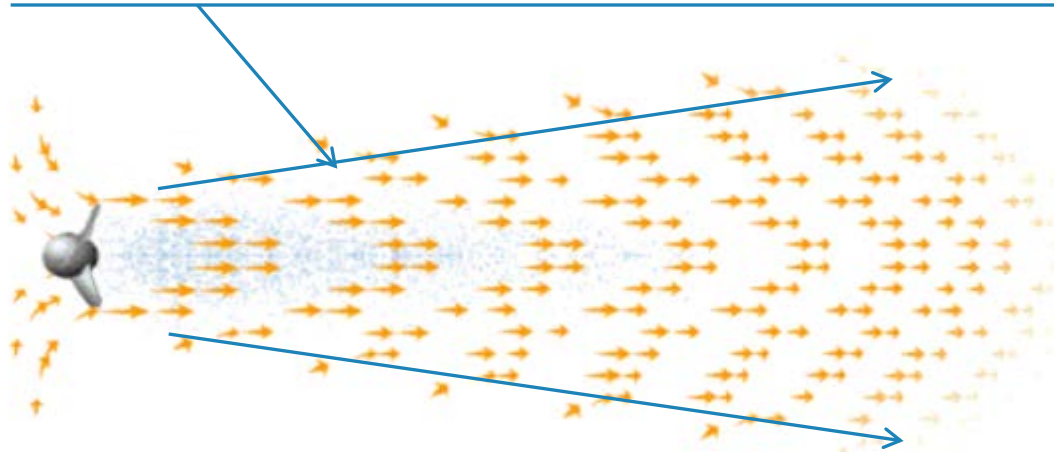


Creating Mixing and Bulk Flow



Mixer Jet

- Jet drives both primary flow and bulk flow
- Jet brings the surrounding liquid into motion
 - The surrounding low-velocity liquid is entrained
 - Majority of the mixing is not in the prop-area
 - Intensive mixing happens along the jet border

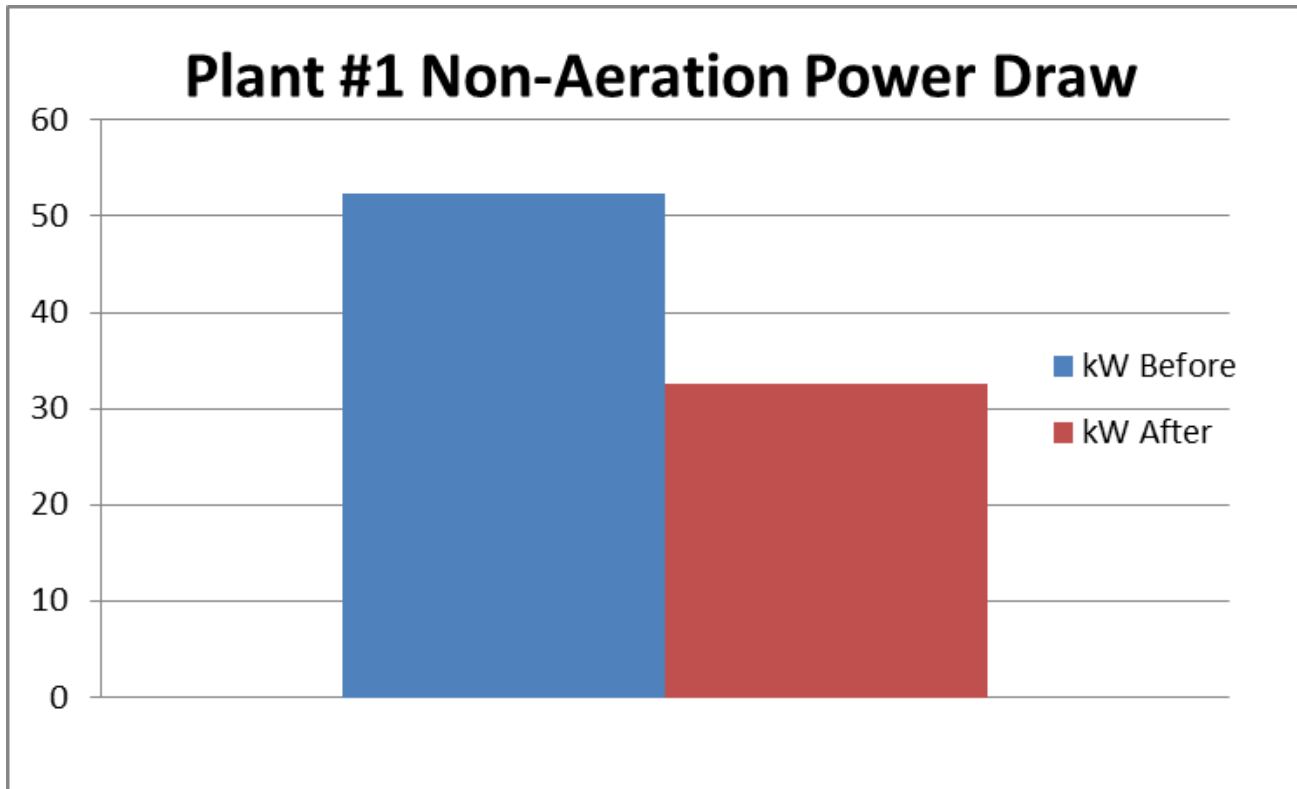


2.5 HP / 4.0 HP

7.5 HP / 2.5 HP



Savings



What is that in dollars?

* Equipment Cost	\$200,000
* Installation Cost	\$7,100
* Focus on Energy Grant	(\$32,498)
* Project Cost	\$174,602
* Average Power Use	115 kW
* Annual Power Savings	\$82,300

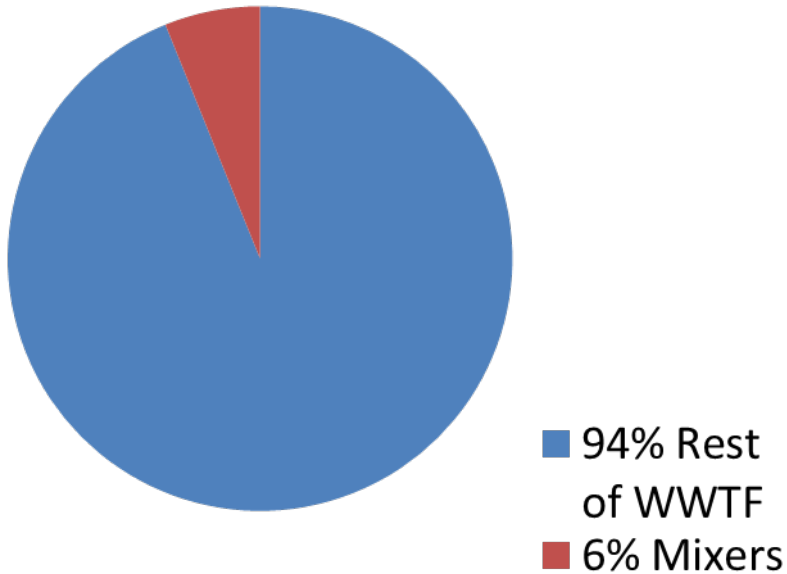


Calculated costs

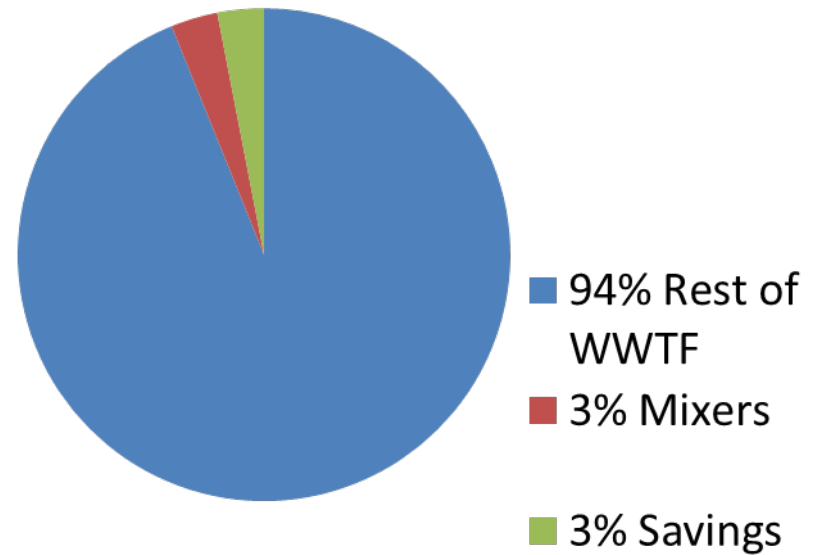


Electrical usage

Before



After



Old vs. New



Observations and Takeaways

- * Testing resulted in project modification
- * Proposal structure potentially double edged
- * Plan to further reduce
 - * Order for remaining mixers is placed
 - * May evaluate intermittent operations
- * Look for the overlooked



Questions?

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