



EXPERIENCES WITH A PUTSCH JET WASH ROLLER TABLE

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American
Crystal
Sugar
Company

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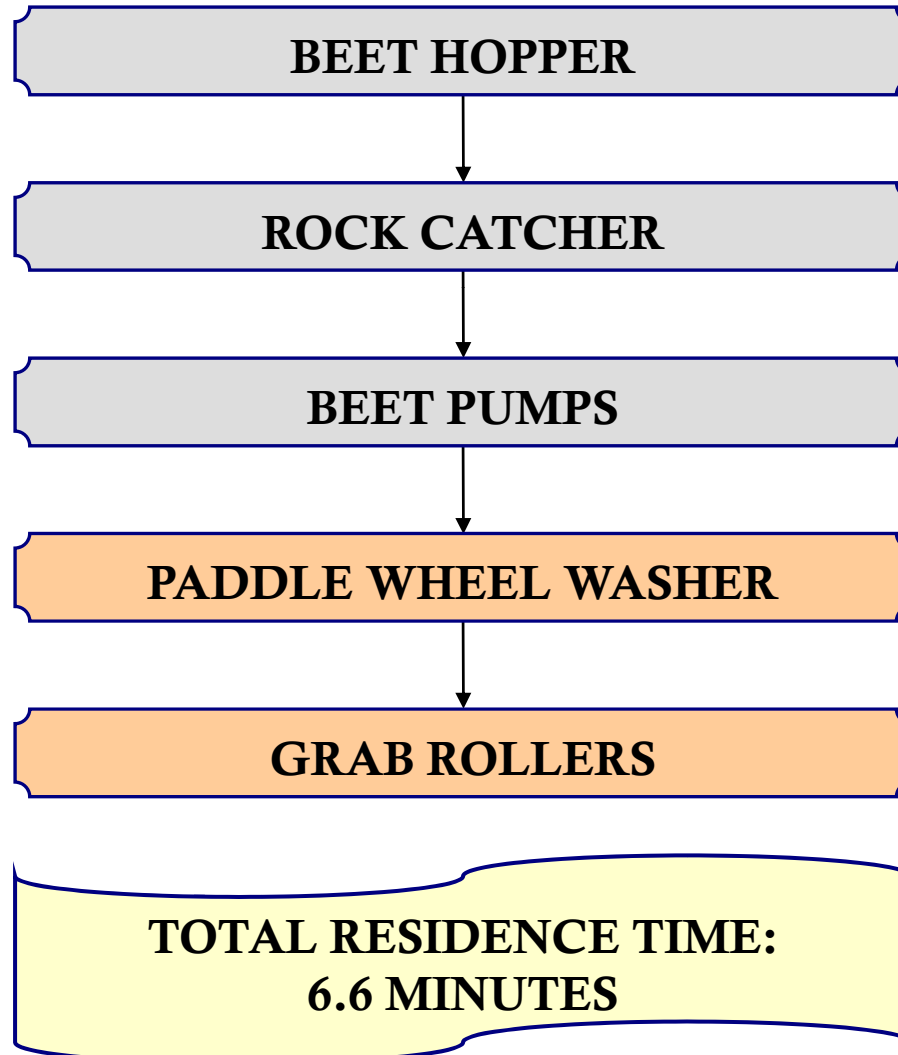
BACKGROUND INFORMATION

- American Crystal Sugar Company
 - Farmer owned Cooperative
 - 6 Factories total: Minnesota (3), North Dakota (2), and Montana (1)
 - Approximately 10,000,000 tons of beets
 - 250 days of operation (September – May)
 - Long term beet storage required
 - Fresh Beets
 - Frozen Beets

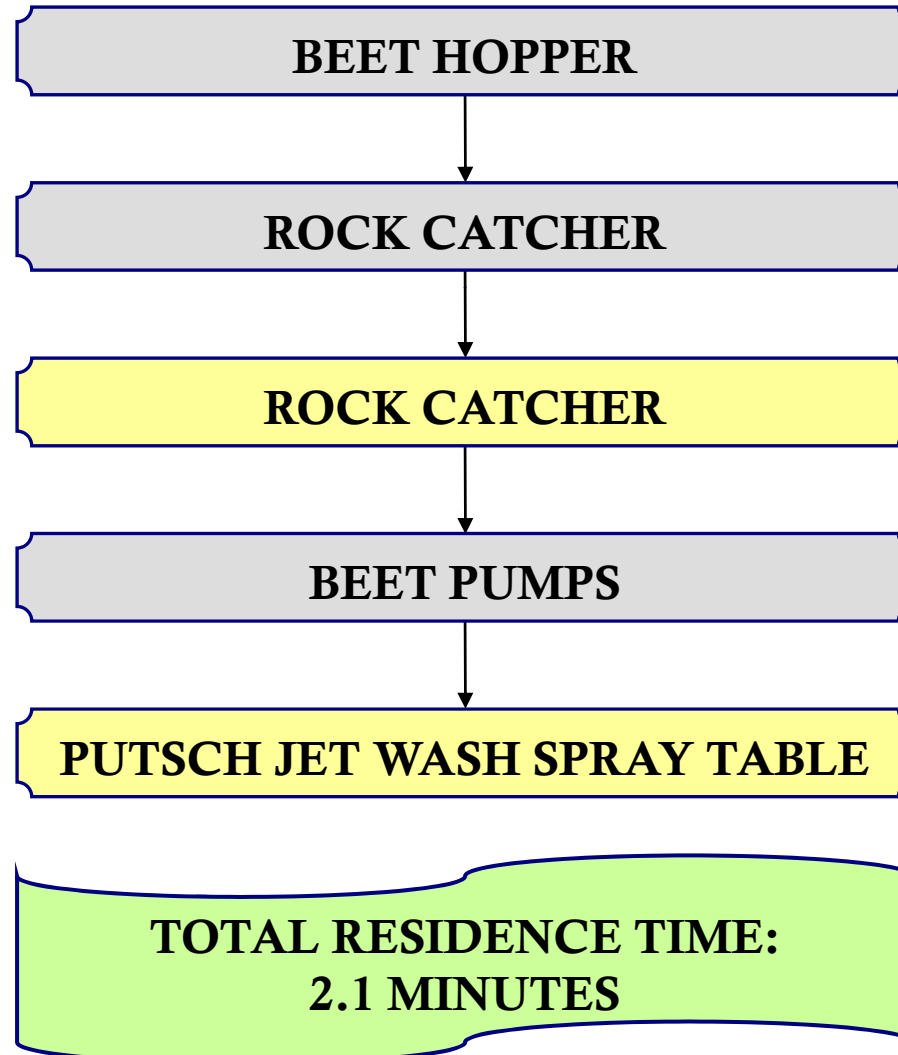
BACKGROUND INFORMATION

- Valley Slice ~ 37,000 tpd
 - East Grand Forks, MN – 9000 tpd
 - Hillsboro, ND – 9000 tpd
 - Drayton, ND – 7000 tpd
 - Moorhead, MN – 6000 tpd
 - Crookston, MN – 6000 tpd

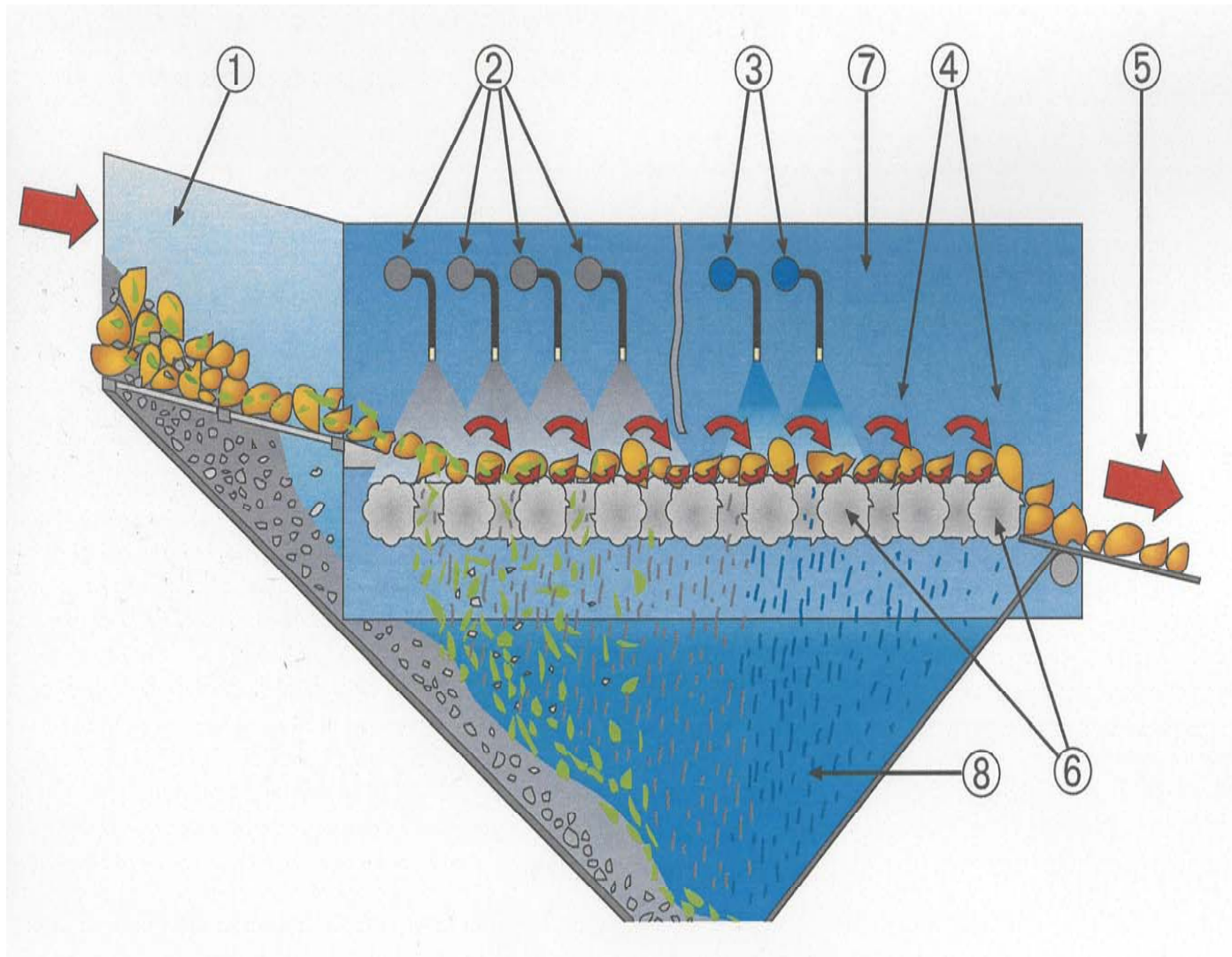
OUR PROCESS – WHERE WE BEGAN



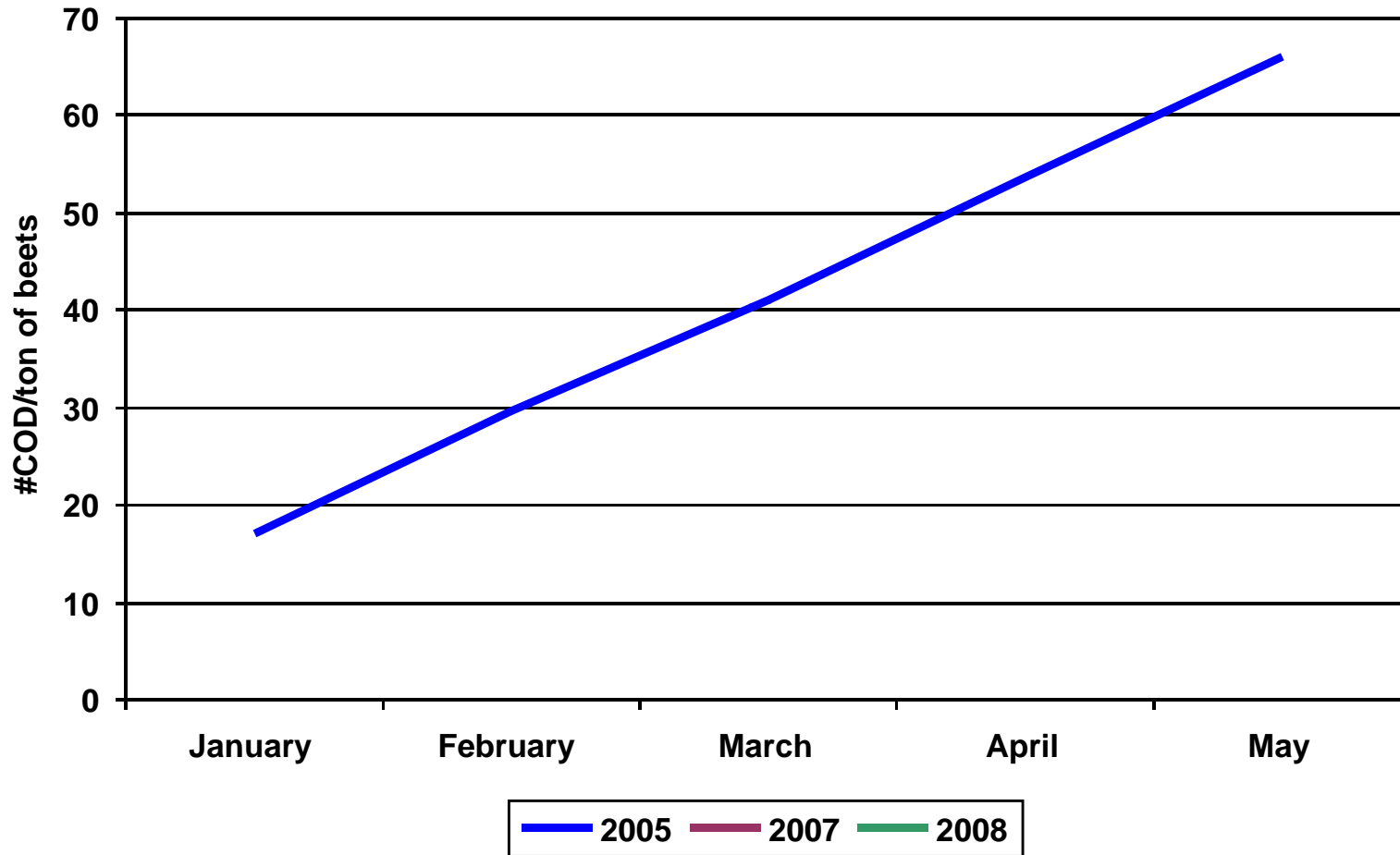
OUR PROCESS – WHAT WE HAVE NOW



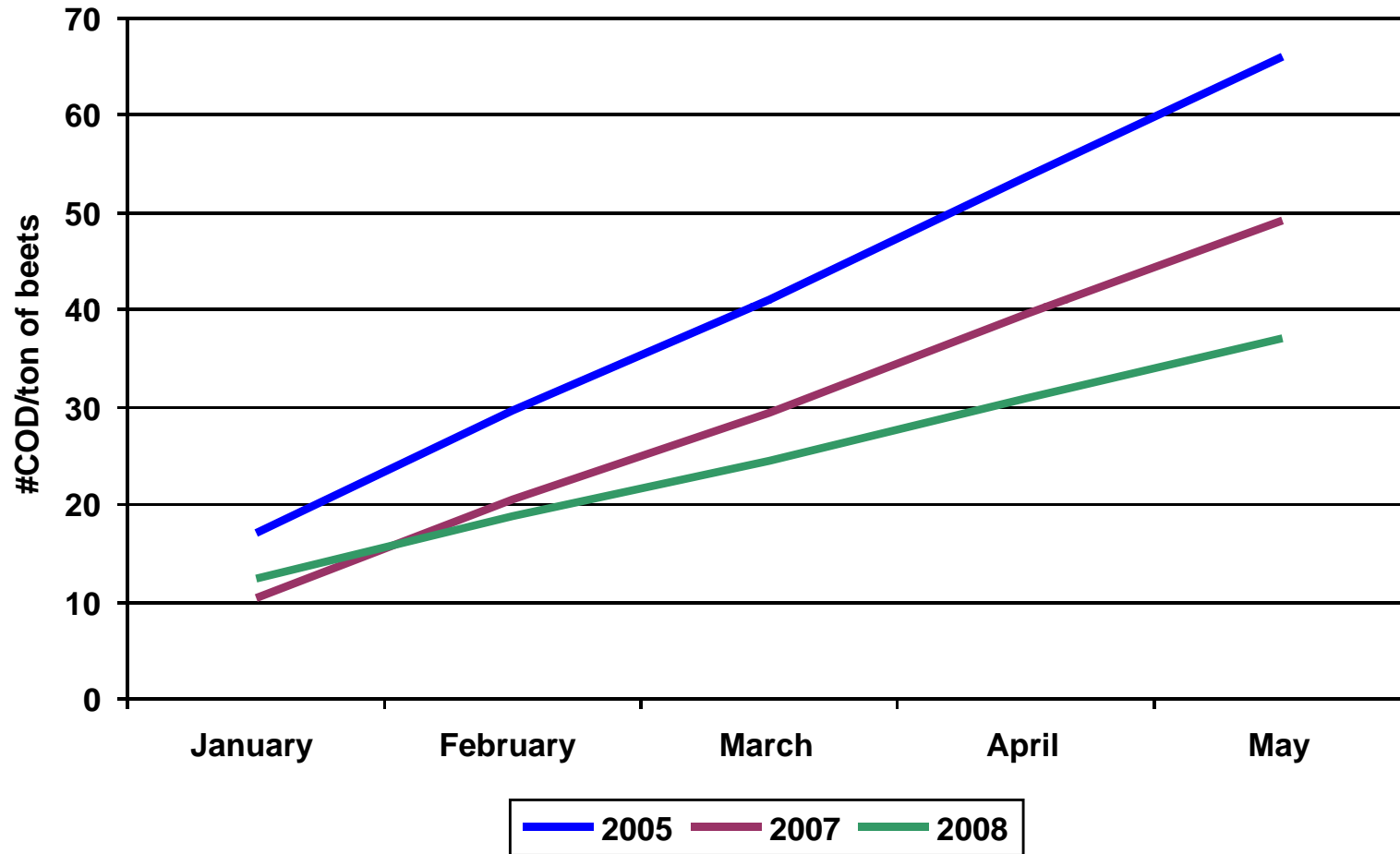
PUTSCH JET WASH ROLLER TABLE GENERAL LAYOUT



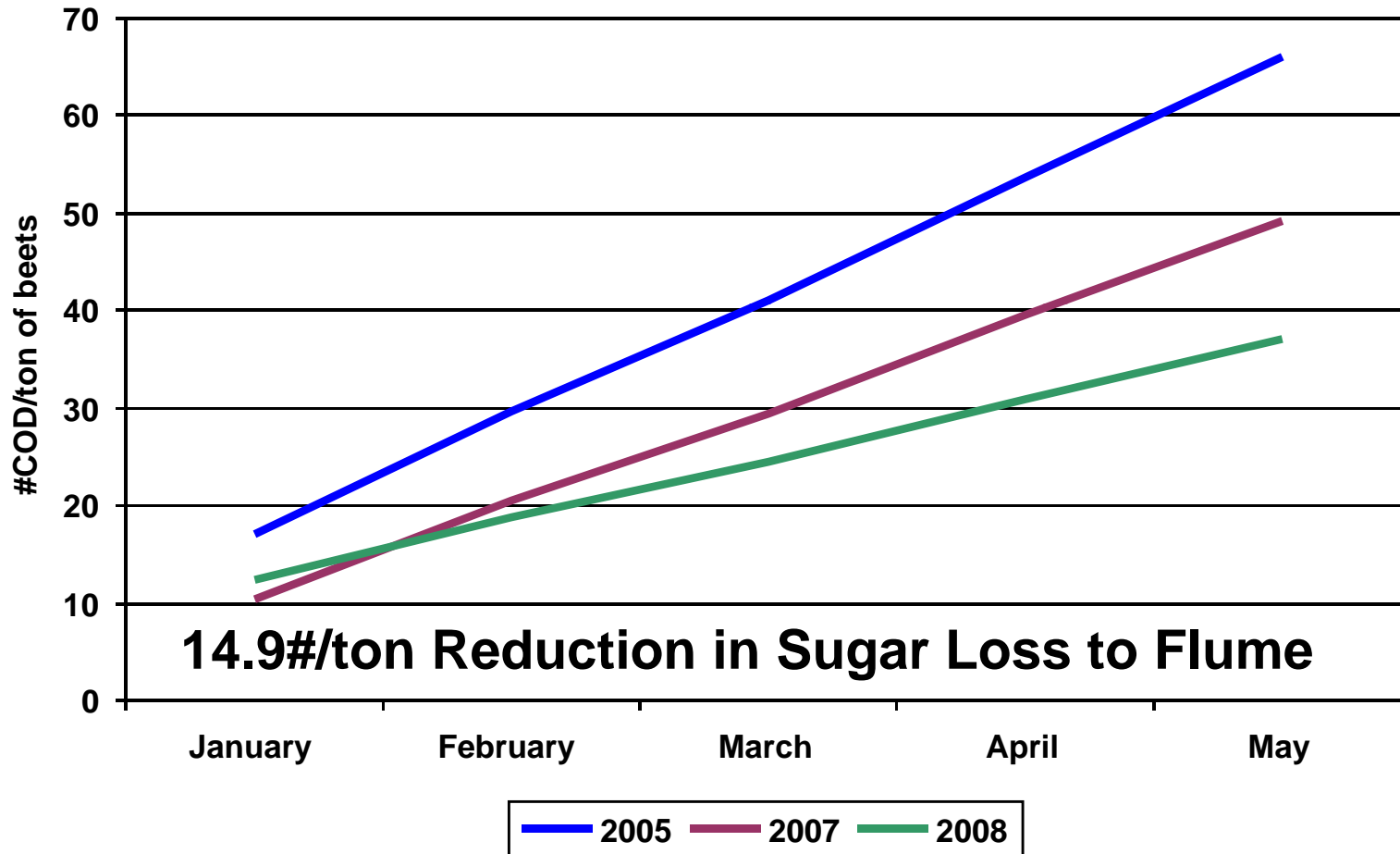
FLUME LOSS YEARLY COMPARISON



FLUME LOSS YEARLY COMPARISON

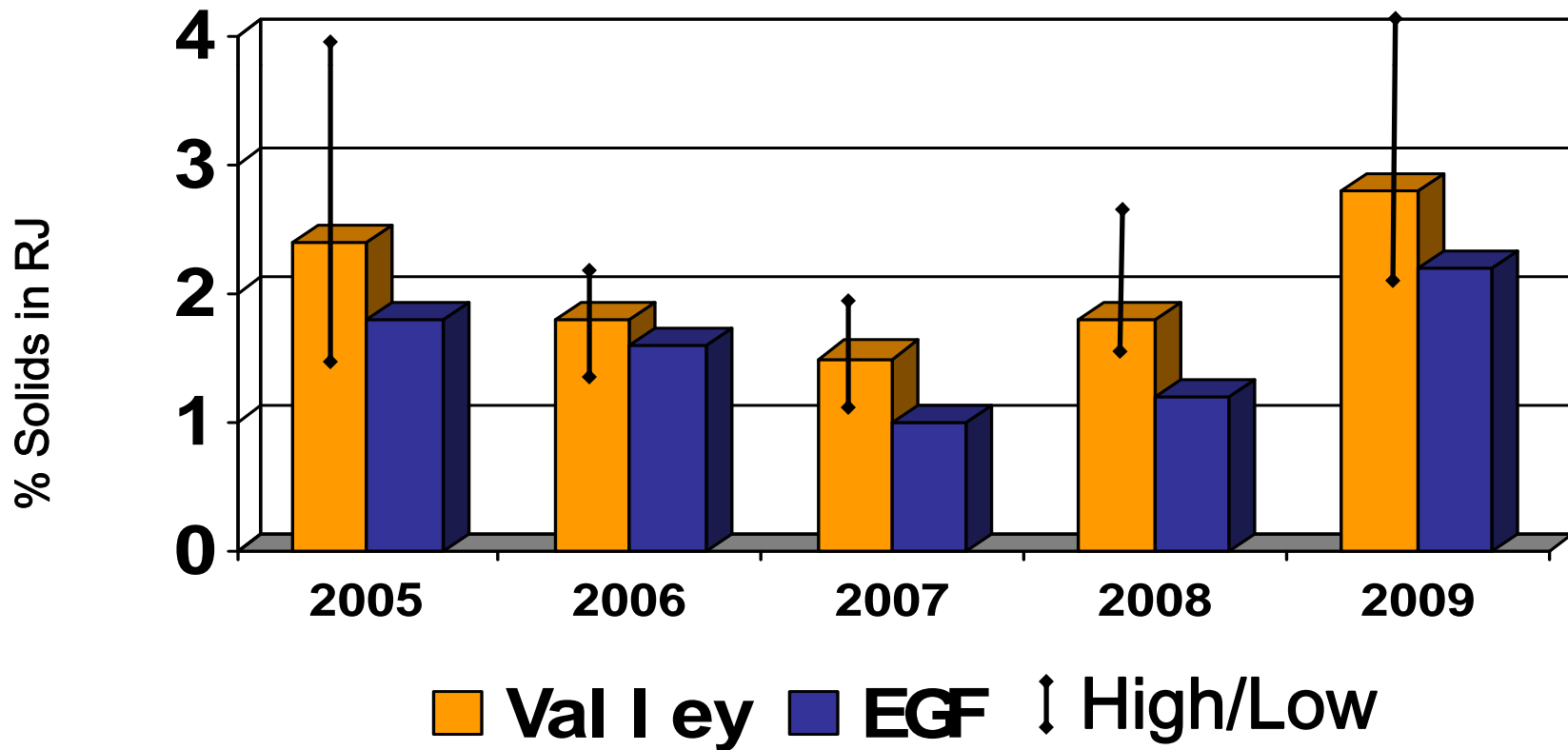


FLUME LOSS YEARLY COMPARISON



BEET WASHING EFFECTIVENESS

Raw Juice Solids Comparison



INFECTION CONTROL

- Comparison before and after spray table
 - Lactic Acid Turndown Ratio (LATR)

$$\text{LATR} = \frac{\text{Flume Lactic Acid}}{\text{Raw Juice Lactic Acid}}$$

2006 - LATR = 39

2007 - LATR = 75

PROJECT DETAILS - INSTALLATION

- Putsch Jet Wash Roller Table – installation relatively simple

Challenges – Beet distribution and outlet chute

- Beet washer feed – beet distribution
 - From beet pump pipe outlet drop 6” to 16’ long rectangular chute
 - beets naturally distribute entire width of washer
 - Grizzly Bar inlet to washer – removes most of transport water
- Outlet chute
 - 90 degree curve – 8’ drop
 - Beets would plug on chute and “fly out”

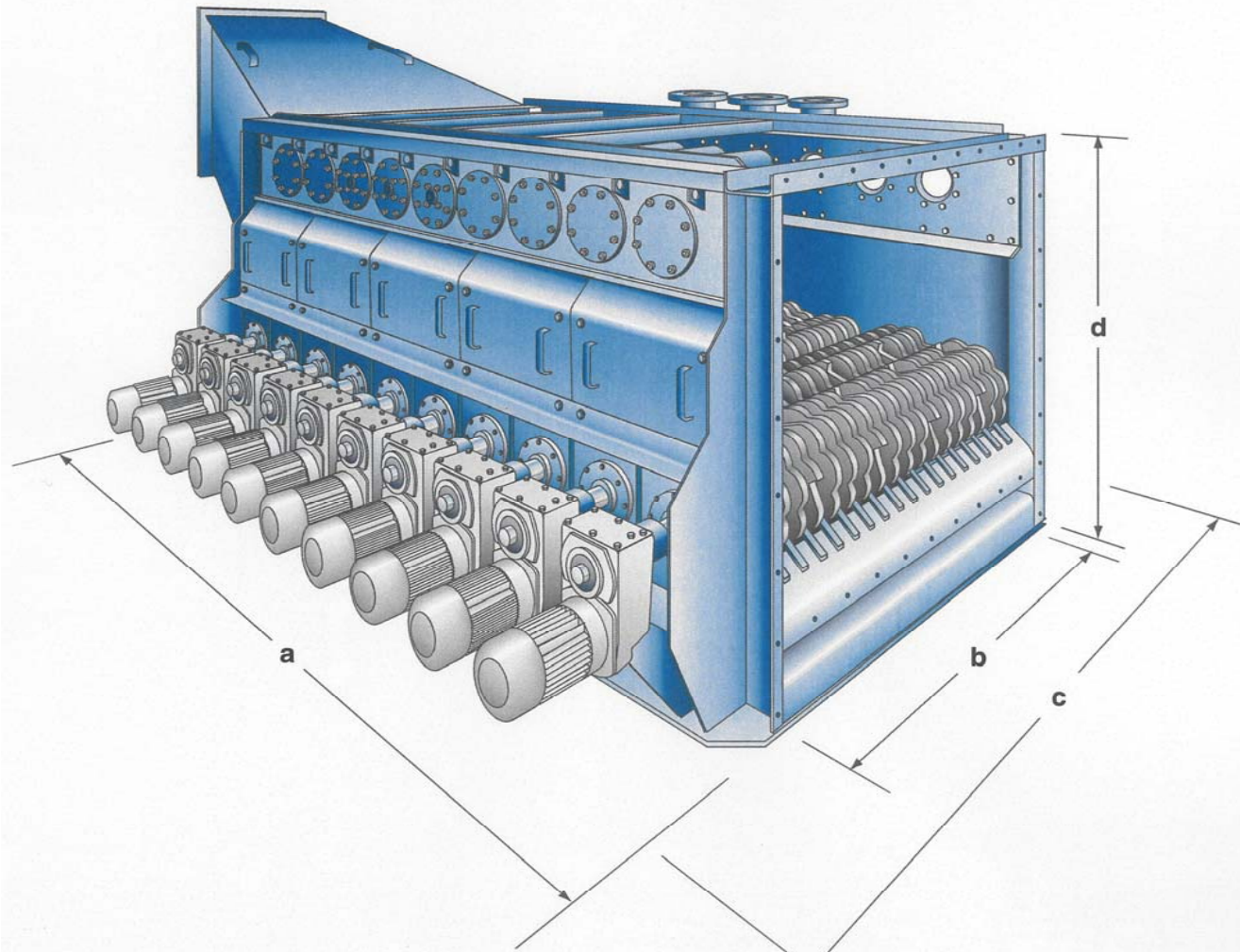
PROJECT DETAILS - ENVIRONMENTAL IMPACT

- Project had significant impact on reducing waste water inventory and overall factory odors
- Improved flume water loss accounting
- Better water management practices
 - All water added at clean water sprays offset by other dilution water sources

SPRAY TABLE MAINTENANCE CONCERNS

- Gearboxes - Shaft attachment – problem resolved
- 18 rollers shaft bearings replaced after two years
 - Seals are good
 - Auto-greasing installed
- Rollers – no appreciable wear to date

PUTSCH JET WASH ROLLER TABLE



CHALLENGES AND NEXT STEPS

- Clarified water supply
 - Protecting nozzles from plugging
 - Wear of nozzles
 - Plugged headers and nozzles
 - Clarifier level control
 - Strainer design
- Pump design and capacity

Questions

