

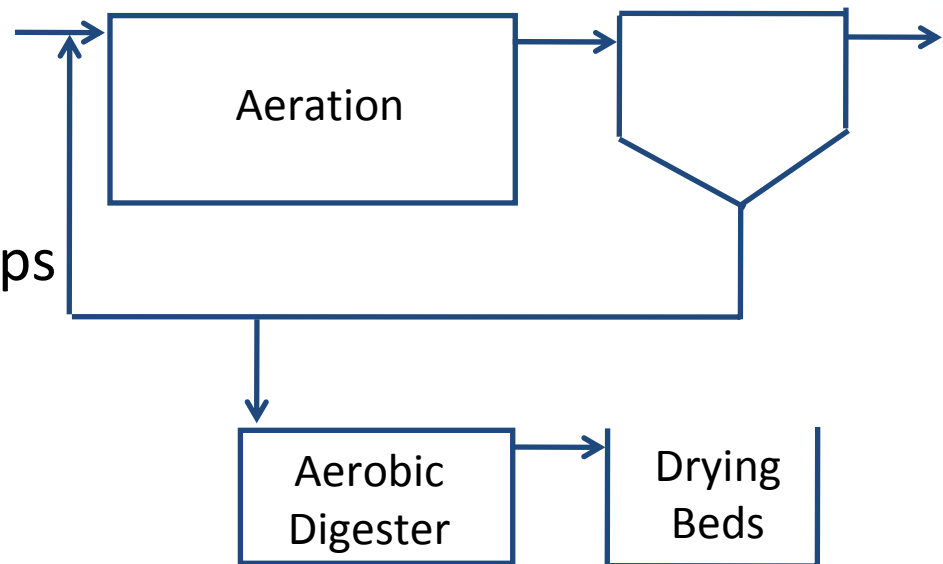


# Automatic Sludge Age Control Wasting Pounds Instead of Gallons

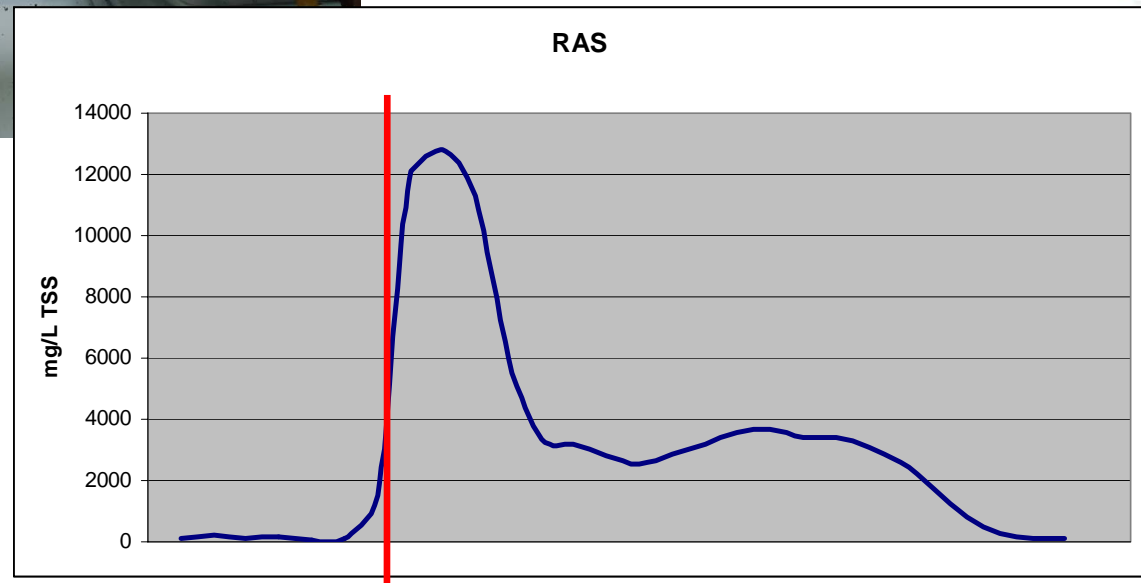
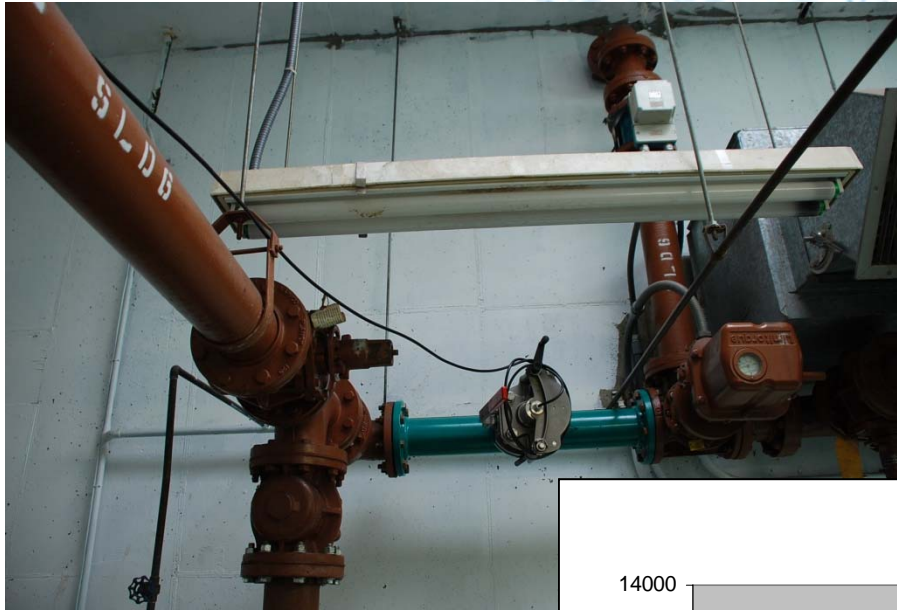
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# Introduction

- Morrison, Colorado
  - 100,000 gallon per day
  - Conventional Activated Sludge
  - Problems with:
    - Aerobic Digester
    - Sludge Drying Beds
    - Oversized RAS pumps
  - One Operator



# Installed TSS Meter in RAS





# What Else Can We Do?

- We know real time concentration
- We know flow
- We can determine:
  - Pounds wasted in each event
  - Total Pounds wasted
- Can we automatically waste until a setpoint?
- Created “Automatic Wasting” program



# Is That All?

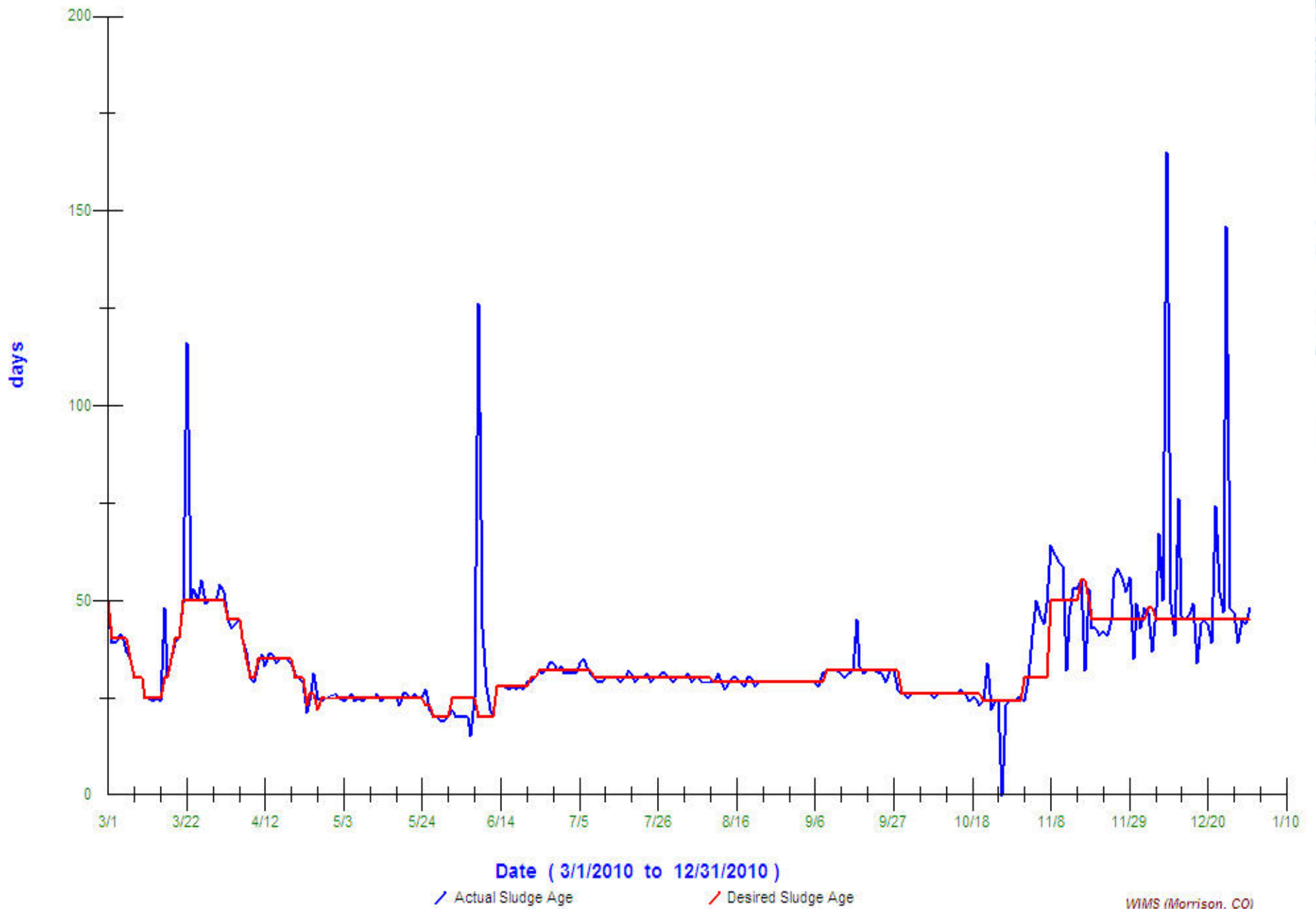
- Solved digester problem
- Solved drying beds/sludge hauling problems
- Simplified wasting
- What else can we do?

# Add TSS Meter to Mixed Liquor



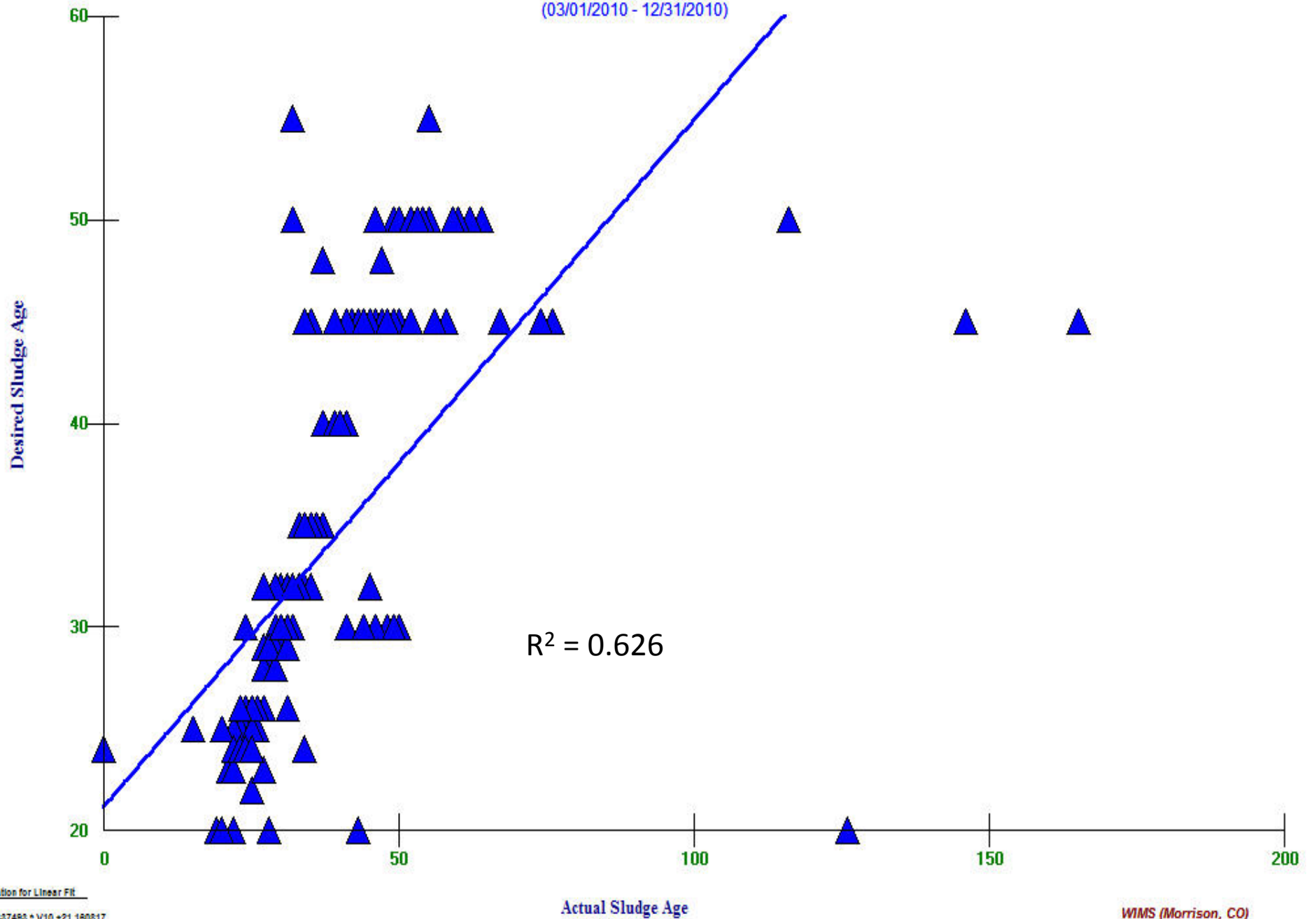


## Desired & Actual Sludge Age



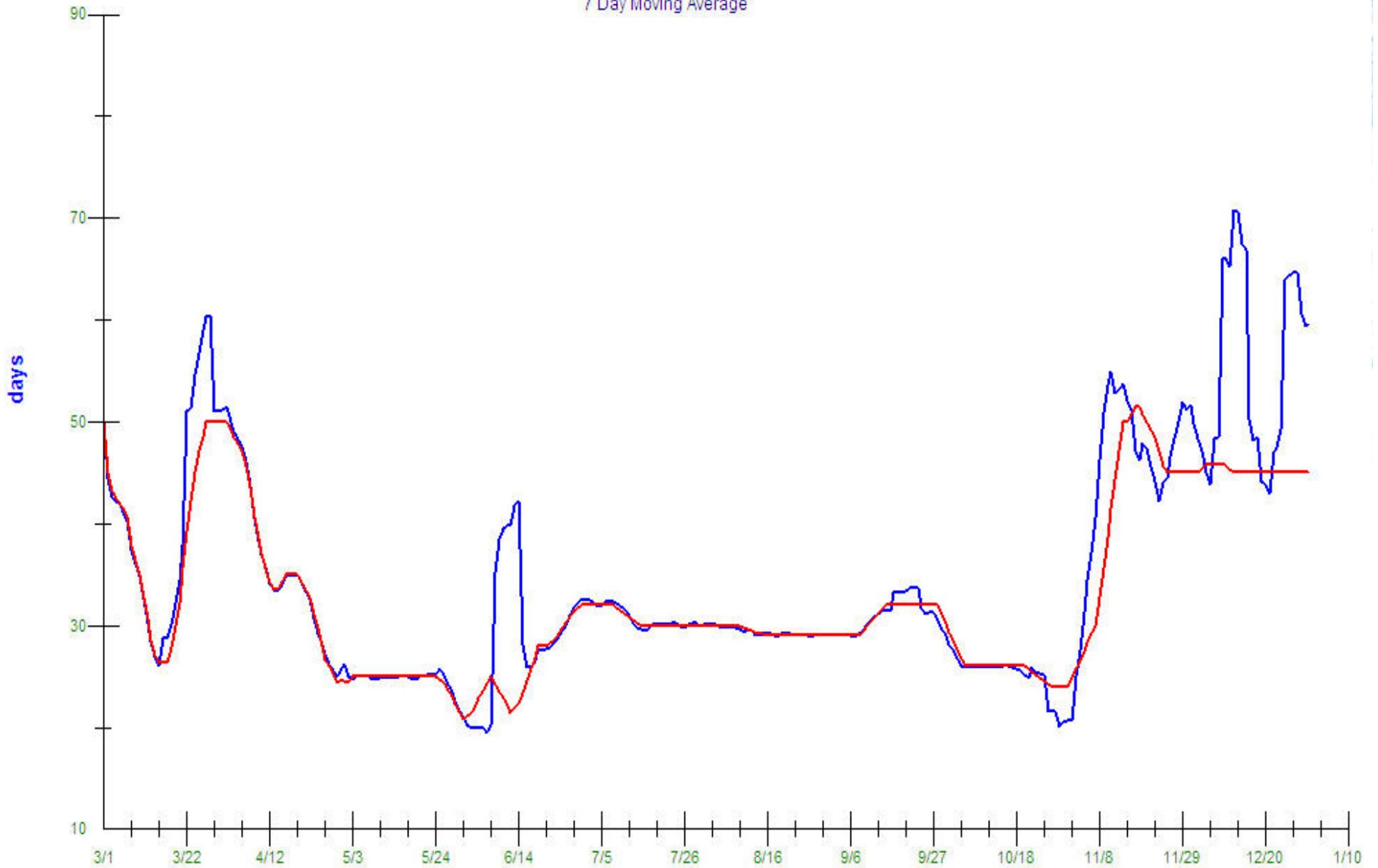
# Desired vs Actual Sludge Age

(03/01/2010 - 12/31/2010)



# Desired & Actual Sludge Age

7 Day Moving Average



Date ( 3/1/2010 to 12/31/2010 )

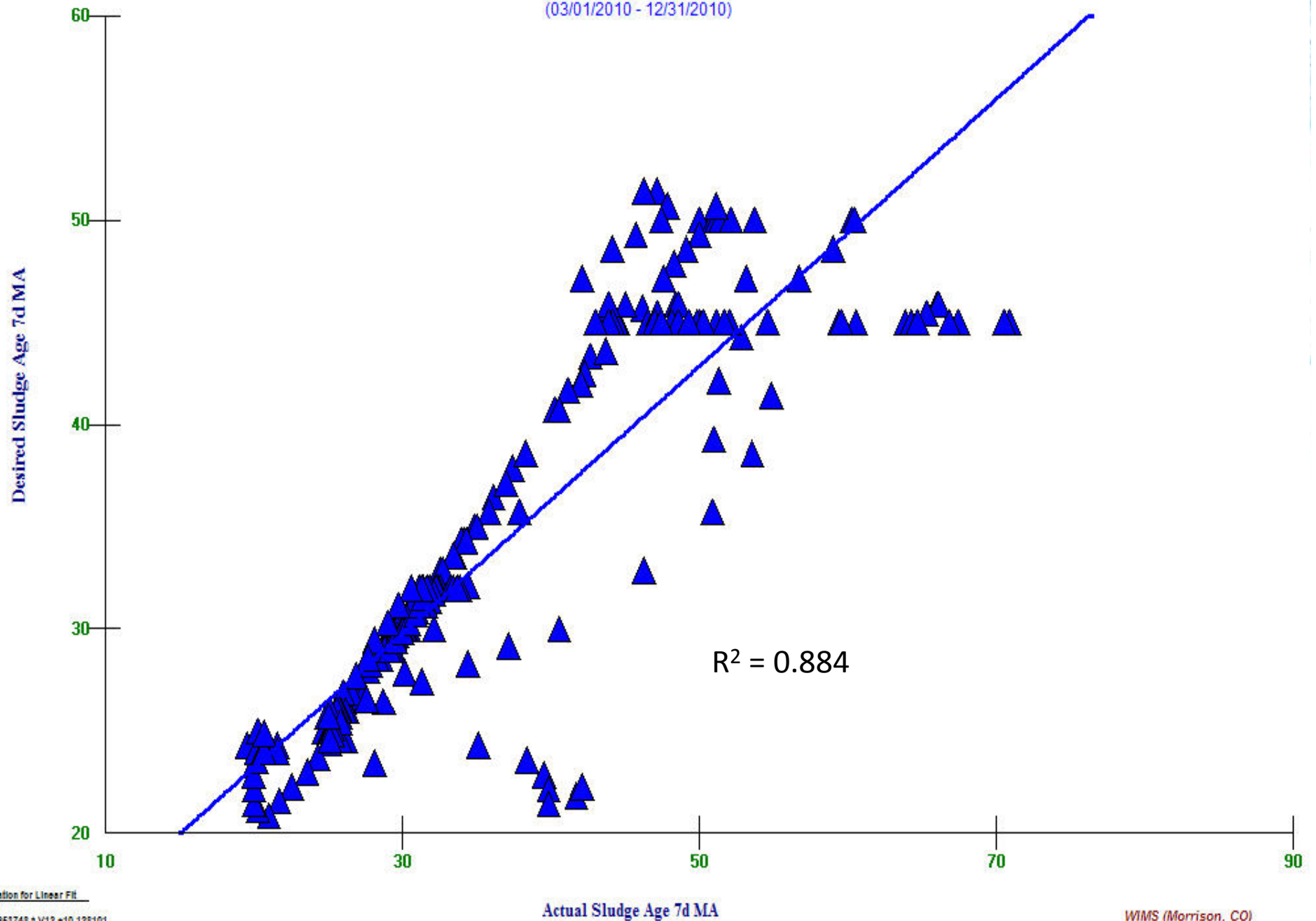
Actual Sludge Age 7d MA

Desired Sludge Age 7d MA

WMS (Morrison, CO)

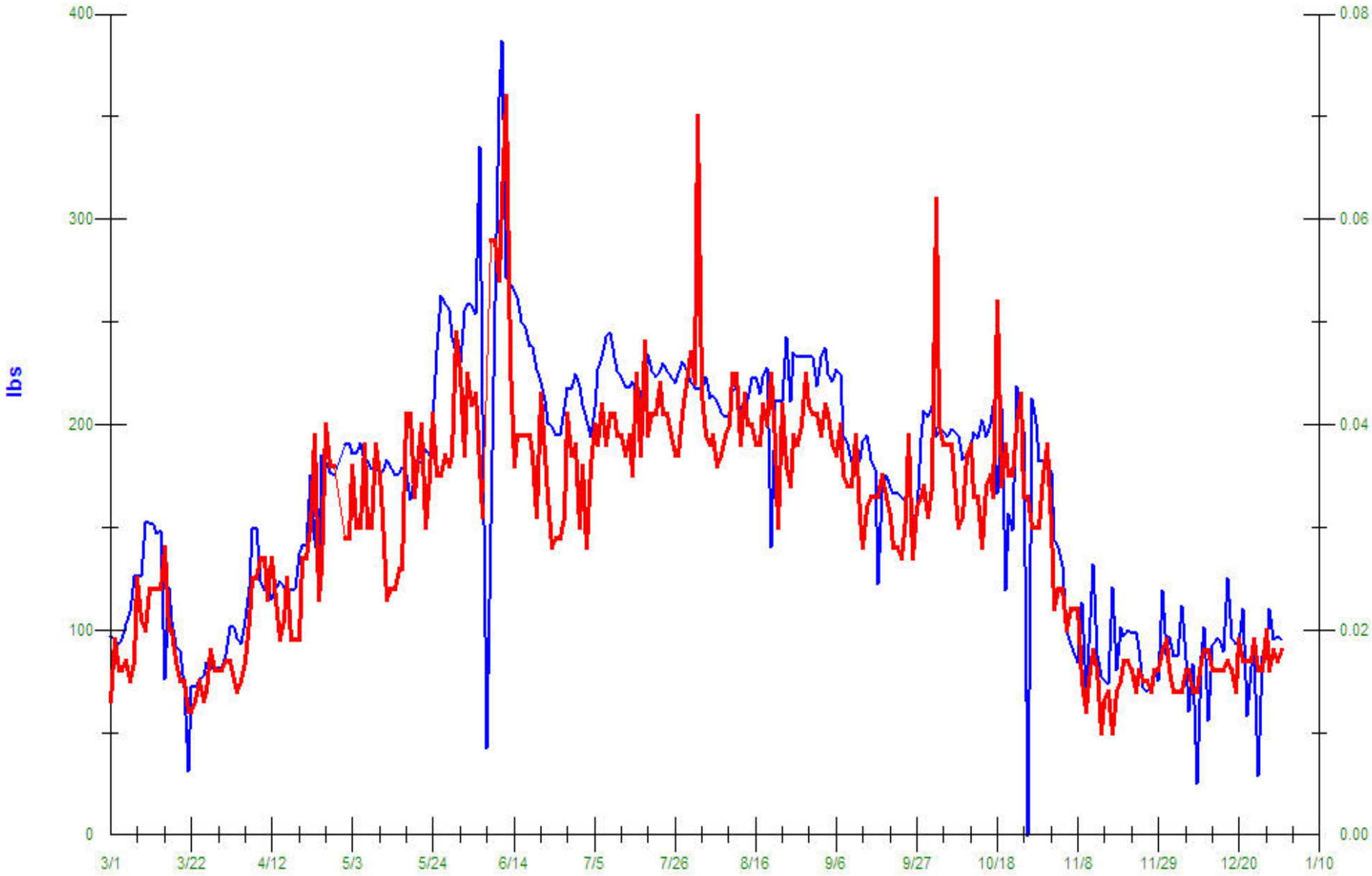
# 7d Desired vs Actual Sludge Age

(03/01/2010 - 12/31/2010)



Equation for Linear Fit  
 $Y = 0.863748 \cdot X + 10.128101$   
Correlation Coefficient = .884173

### Pounds Wasted & WSU



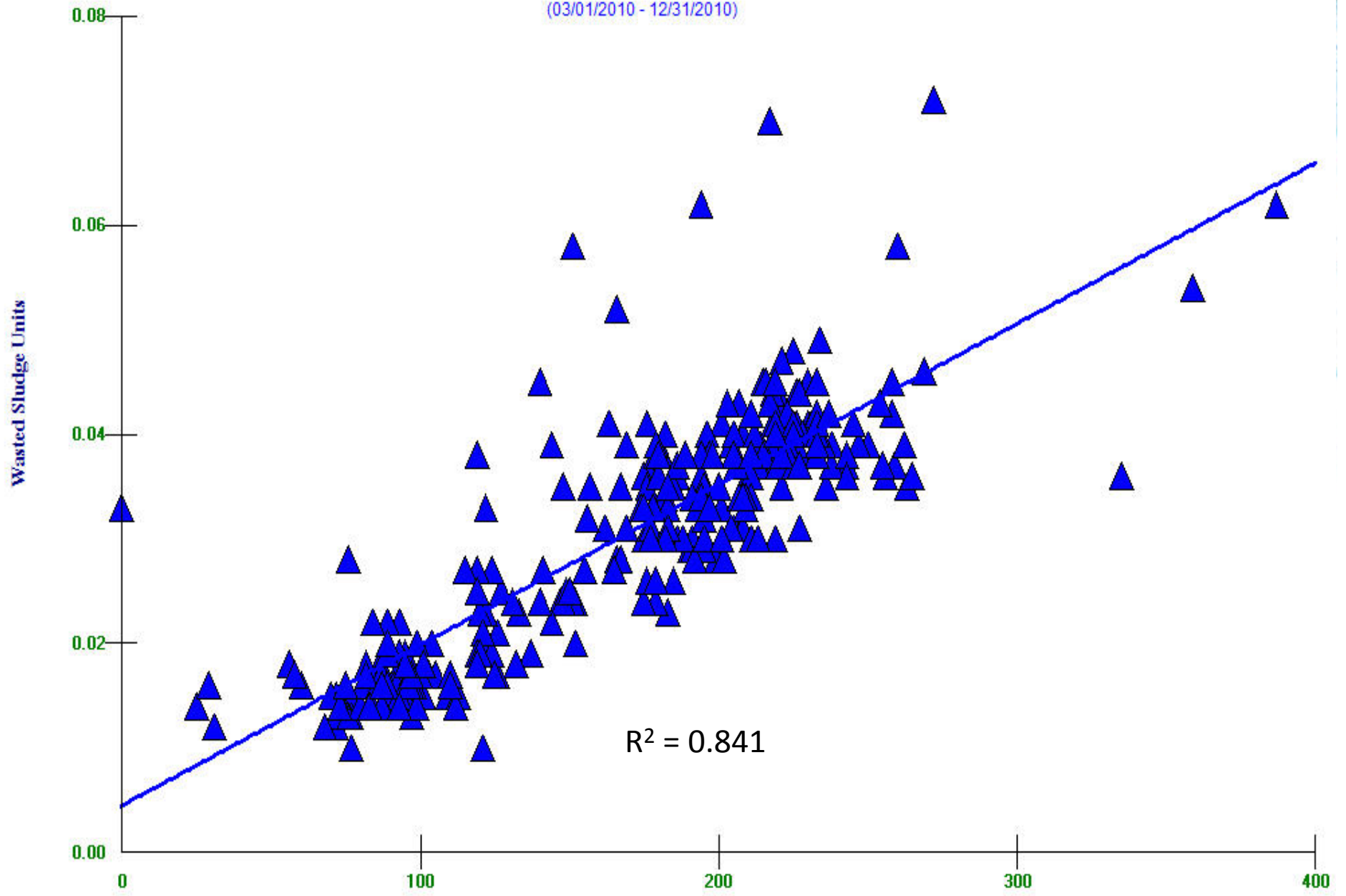
Date ( 3/1/2010 to 12/31/2010 )

Wasted Sludge Wasted Sludge Units

WMS (Morrison, CO)

# Lbs vs WSU

(03/01/2010 - 12/31/2010)



Equation for Linear Fit

$$Y = 0.000164 * X20 + 0.004467$$

Correlation Coefficient = .841384

Wasted Sludge

WMS (Morrison, CO)



# Conclusions

- While small scale, results show automating sludge age with TSS meters is reliable
- Automating processes can save operators significant time & energy
- Automation can bring stability & “peace of mind” to a variable process



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