

# Eugene/Springfield Regional WPCF- Bob Sprick Operation Supervisor

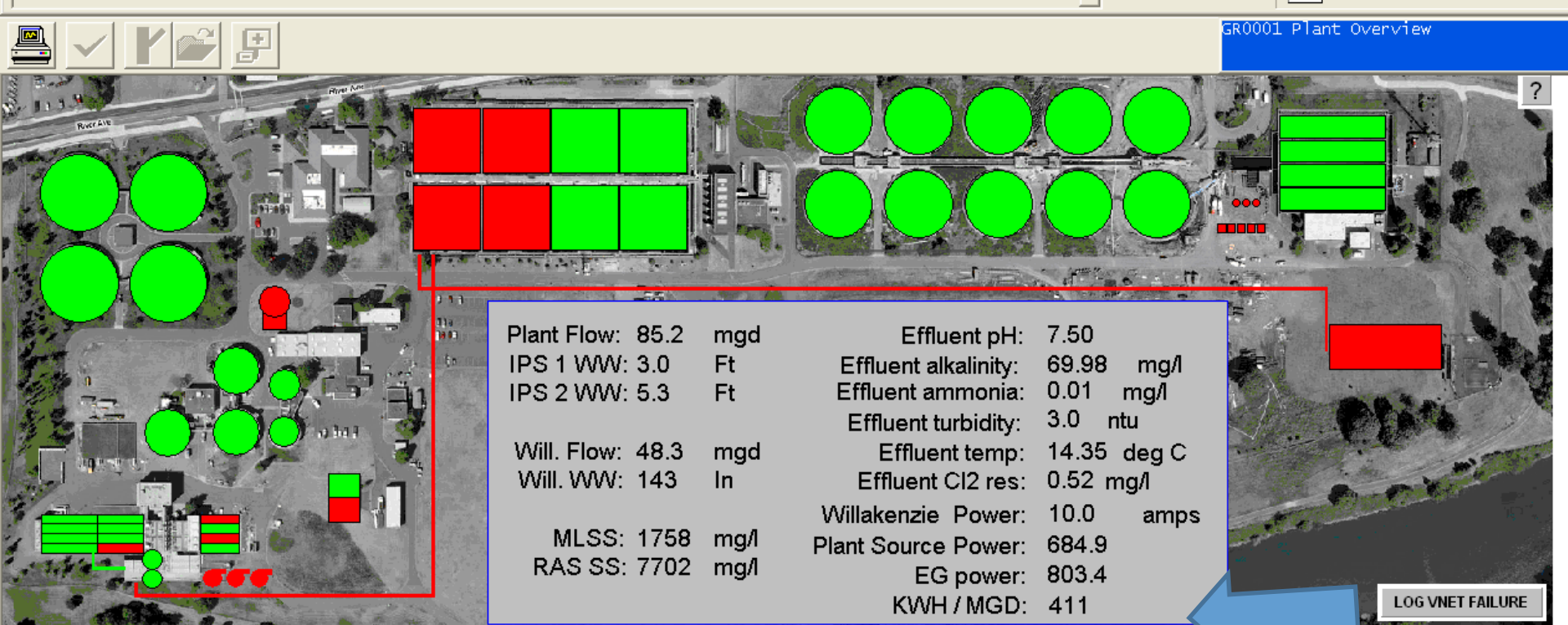
Energy Conservation Measures: Odorous Air Fan Control and Digester Mixing

Services population of 240,000 Over 900 miles collection system 49 Pump Stations

14.5 Billion Gallons Treated in FY12- DWF 59 MGD Peak WWF 277 MGD







- ### Overview Graphics

  - [Pretreat OV](#)
  - [Primary OV](#)
  - [Secondary OV](#)
  - [Final OV](#)
  - [Tertiary Filtration](#)
  - [GBT OV](#)
  - [Digester OV](#)
  - [Gravity Thickener](#)
  - [High Flow Mgmt](#)
  - [Willakenzie OV](#)
  - [Pump Station OV](#)
  - [Pump Station Map](#)
  - [Pump Station Status](#)
  - [BMF and BRS OV](#)

### Information Graphics

  - [Hour Meters](#)
  - [Primary End](#)
  - [Secondary End](#)
  - [BMF](#)
  - [Power and Equipment](#)
  - [Plant Power Analysis](#)
  - [Equipment Status](#)
  - [Alert Messages](#)
  - [Pressure Main Status](#)
  - [Miscellaneous Information](#)
  - [Hydraulic Profile](#)
  - [Phone / Radio #s](#)
  - [High Flow Guide](#)
  - [Ops Guide](#)
  - [Weather and Odor](#)

### Control Graphics

  - [Plant Alarms](#)
  - [Office Alarms](#)
  - [Crytol](#)
  - [Main Gate](#)
  - [Plant Samplers](#)
  - [LEL Meters](#)

### Interactive Programs

  - [Detention Time Calculator](#)
  - [Wastewater Calculator](#)
  - [Windows Calculator](#)
  - [State Point Analysis](#)
  - [Binary/Hex/Decimal Converter](#)
  - [1-Minute Data Logging](#)
  - [1-Second Data Logging](#)
  - [Programming Log](#)
  - [Comment Log](#)

### Trends

  - [System Flows 10 Sec 10 Min](#)
  - [Wetwells](#)
  - [pH & LEL 10 Sec 10 Min](#)
  - [Chlorine Res 1 Min 10 Min](#)
  - [Gas Pressure 10 Sec](#)

# Odorous Air Fans- ECM



Two 100HP 48" fans VFD

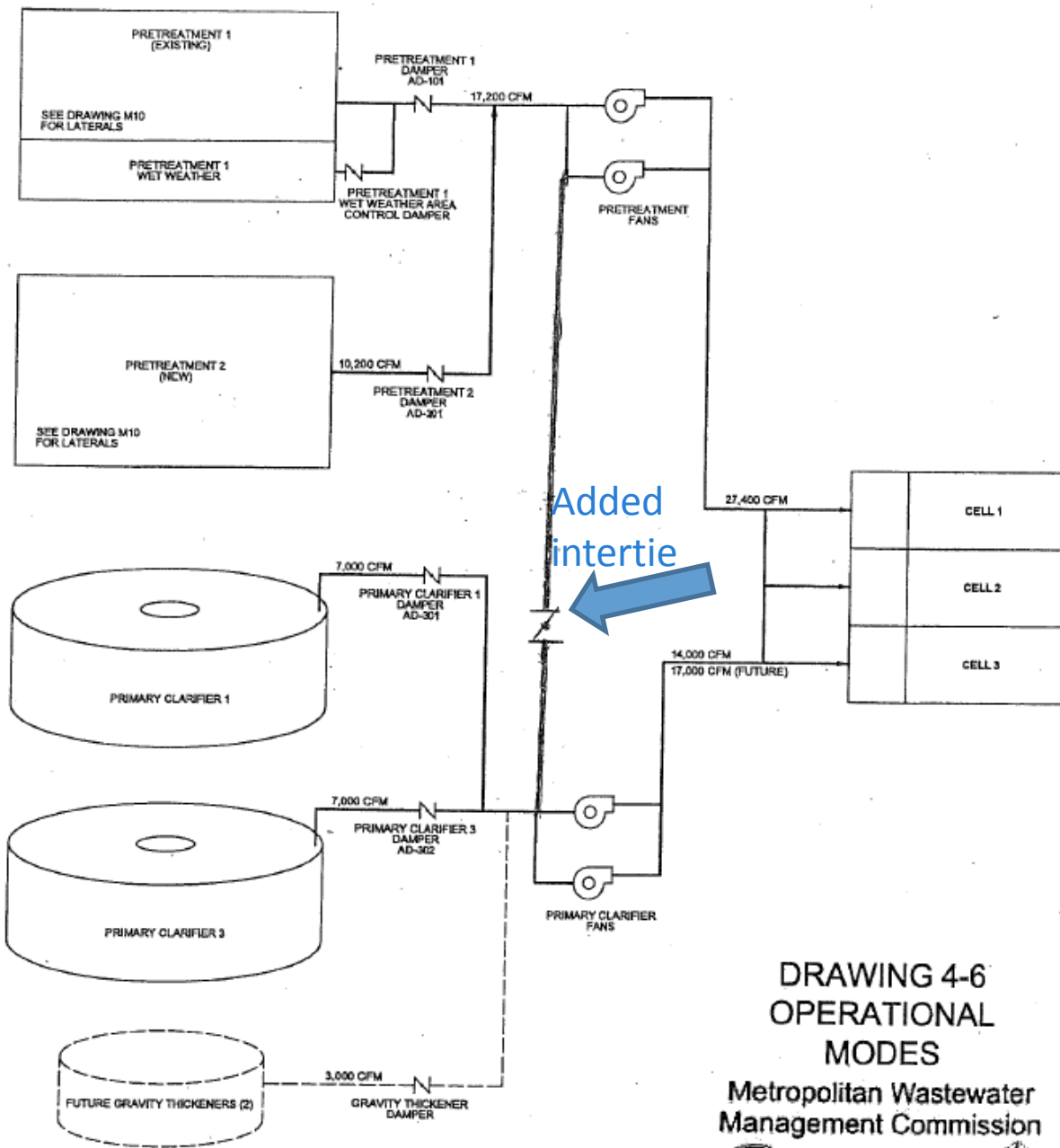
Two 50 HP 36" fans VFD

Three 1500 ft<sup>2</sup> biofilters filled with Biorem media

Two 145 ft diameter covered Primary Clarifiers- Design air flow 14,000 cfm

Covered Pretreatment structure- Design air flow 27,400 cfm

One 70 ft diameter Gravity Thickener- Design air flow 3,000 CFM



## DRAWING 4-6 OPERATIONAL MODES

Metropolitan Wastewater  
Management Commission



partners in wastewater management

Contacted Energy Provider during design. ECM to install VFD and DCS control instead of conventional motor starter control panel.

Developed a contract and estimated savings.

Standard question for all pieces of equipment- Run or Operate

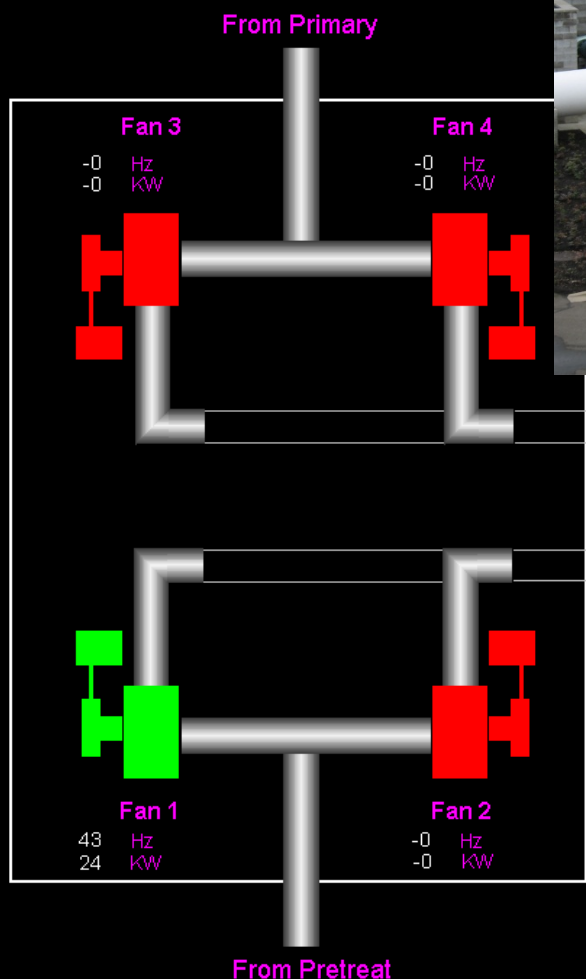


HIS Start

GR0120 Odorous Air System

## Odorous Air Handling

Monthly power cost: \$1011.63



Biofilter Sump



### Overviews:

[Plant Overview](#)  
[Headworks](#)  
[Solids Handling](#)  
[Barscreen OV](#)  
[Grit System OV](#)  
[Influent Piping](#)  
[Screw Pmp OV](#)

### Control Groups:

[Grit & Rag Conveyors](#)  
[IPS2 Pump Ctrl](#)  
[Screw Pump Ctrl](#)  
[CABs](#)

### Trends:

[Barscreens](#)  
[Grit Collectors](#)  
[Wetwells & Pumps](#)  
[Recycle Wetwell](#)  
[pH & LEL Short Term](#)  
[pH & LEL Long Term](#)

# Odorous Air ECM

VFD Control of 100 HP and 50HP Fans

Incentive Savings \$80K.

536,000 KWH saved annually.

Air flow 41,000-25,000 cfm

VFD cost to project \$108,000

Annual Power savings \$ 33,000

Payback 8 months



Month	KWH	\$\$\$\$\$\$\$
Month	KWH	Cost
→ Jan-11	77,748	\$4,587
Feb-11	70,224	\$4,143
Mar-11	76,632	\$4,521
→ Apr-11	43,992	\$2,596
May-11	36,582	\$2,158
→ Jun-11	30,643	\$1,808
Jul-11	26,085	\$1,539
Aug-11	21,866	\$1,290
Sep-11	19,087	\$1,126
Oct-11	18,459	\$1,089
→ Nov-11	18,310	\$1,080
Dec-11	14,910	\$880
Jan-12	14,831	\$875
Feb- 12	13,857	\$818
Mar -12	14,651	\$864

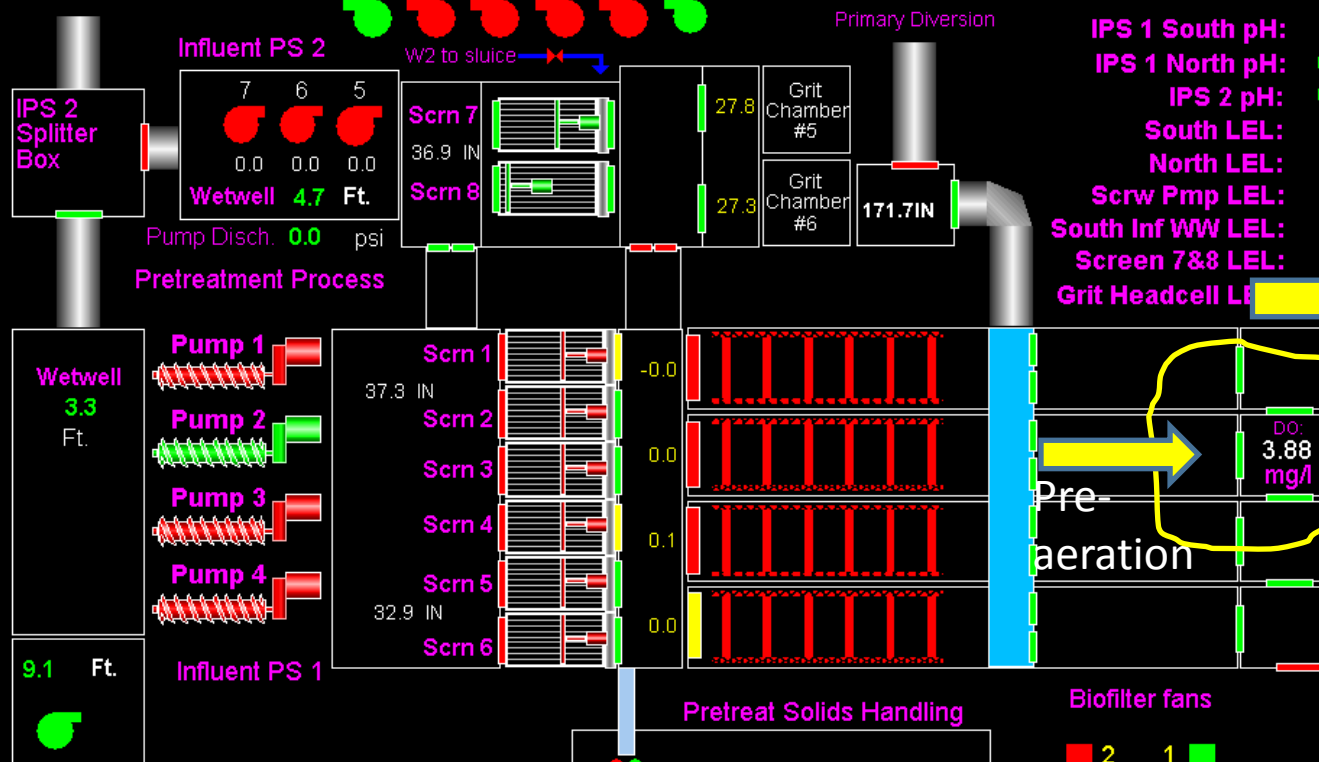
# Biofilter Fan Data Sheet

Hz		Air flow cfm	Air flow cfs	Air Temp	Power Usage KW				
Big Fan 48" 100 HP									
hz	cfm/hz	cfm	cfm/kw	cfs	cfs/kw		hp	kw	\$/Mo @ .062
60	637	38227	617	637	10	65.9	83	62	\$2,768
58	631	36572	665	610	11	65.8	74	55	\$2,455
56	616	34489	676	575	11	65.7	68	51	\$2,277
54	627	33853	769	564	13	65.6	59	44	\$1,964
52	629	32725	818	545	14	65.5	54	40	\$1,786
50	621	31067	863	518	14	65.5	48	36	\$1,607
48	616	29575	924	493	15	65.1	43	32	\$1,428
46	616	28322	977	472	16	65.2	39	29	\$1,295
44	606	26681	1026	445	17	65.3	35	26	\$1,161
42	623	26184	1138	436	19	65.4	31	23	\$1,027
AVG	622								
Small Fan 36" 50HP									
hz	cfm/hz	cfm	cfm/kw	cfs	cfs/kw		hp	kw	\$/Mo @ .062
60	428	25706	829	428	14	70.9	42	31	\$1,384
58	430	24962	861	416	14	70.6	39	29	\$1,295
56	431	24154	929	403	15	70.3	35	26	\$1,161
54	440	23753	990	396	16	70	32	24	\$1,071
52	442	22998	1095	383	18	66.9	28	21	\$937
50	430	21500	1132	358	19	66.7	25	19	\$848
48	440	21103	1241	352	21	66.6	23	17	\$759
46	435	20000	1333	333	22	66.3	20	15	\$670
44	440	19362	1489	323	25	66.2	17	13	\$580
AVG	435								

## Pretreatment Overview

Phone: 8650

Willakenzie 5 4 3 2 1 6 WW LVL 123.2IN



Influent Flow: 55.3 MGD

IPS 1 South pH: 6.5 pH

IPS 1 North pH: 6.4 pH

IPS 2 pH: 6.9 pH

South LEL: 0.3 % LEL

North LEL: 0.1 % LEL

Screw Pmp LEL: -0.3 % LEL

South Inf WW LEL: 0.1 % LEL

Screen 7&8 LEL: 0.1 % LEL

Grit Headcell LEL

Power Draw:

IPS 1 244 KW

IPS 2 A 0 KW

IPS 2 B 6 KW

Energy cost today:

\$ 107.39

CAB operating cost:

\$ 3177 / mo.

### Overviews:

[Plant Overview](#)

[Headworks](#)

[Solids Handling](#)

[Biofilter OV](#)

[Barscreen OV](#)

[Grit System OV](#)

[Influent Piping](#)

[Screw Pmp OV](#)

### Control Groups:

[Grit & Rag Conveyors](#)

[IPS2 Pump Ctrls](#)

[Screw Pump Ctrls](#)

[CABs](#)

### Trends:

[Barscreens](#)

[Grit Collectors](#)

[Wetwells & Pumps](#)

[Recycle Wetwell](#)

[pH & LEL Short Term](#)

[pH & LEL Long Term](#)

### Kilowatts Amps

Screw Pump 1 0 KW

Screw Pump 2 81 KW

Screw Pump 3 0 KW

Screw Pump 4 -1 KW

IPS2 Pump 5 0 KW 0 Amps

IPS2 Pump 6 0 KW 0 Amps

IPS2 Pump 7 0 KW 0 Amps

LEL Horn Silence



Pre-aeration 150 HP  
channel air blower-  
Testing DO meter for  
automating blower  
control.



DO meter sensor fouling - requiring frequent cleaning.

6AI32

RES ANL #5

NR



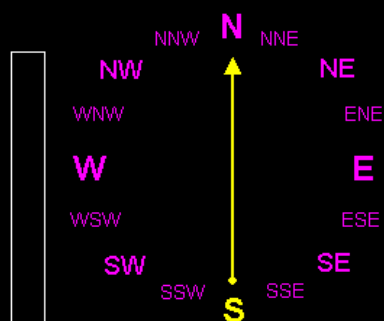
GR0005 weather data

# Plant Weather and Odor-Related Data

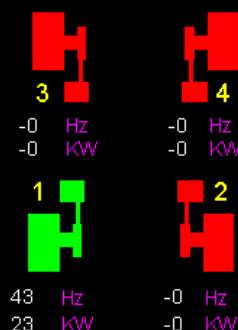
## Biofilter fans

## Pretreat CABs

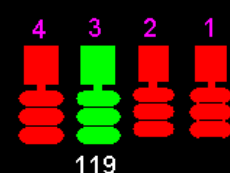
## Carbon Vessel Fans



Current: 0.4 MPH  
2-hr Avg: 1.6 MPH



Monthly power cost: \$978.15



Monthly power cost:  
\$3185.22



Least smelly odor level 1.40 Smelliest

Primary clarifier potential odor:

## 24-hr cumulative direction distribution 1-hr average direction distribution



Plant flow: 51.9

Effluent is 18.00 degrees warmer than the air.

	Current:	Today's high:	Today's low:	Yesterday's high:	Yesterday's low:
Air temperature:	42.34	43.01	37.20	41.05	33.86
Effluent temperature:	60.34	60.48	60.28	60.39	59.84
Barometric pressure:	29.60	29.81	29.59	30.08	29.81

	Current:	Today's peak gust:	Yesterday's peak gust:
Wind speed:	0.4 MPH	8.5 MPH	5.6 MPH

	Today's total:	Rainfall rate, hr:	Today's high rate:	Yesterday's total:	Yesterday's high rate:
Rainfall:	0.000 IN	0.000 IN		0.000 IN	



# Digester Mixers ECM



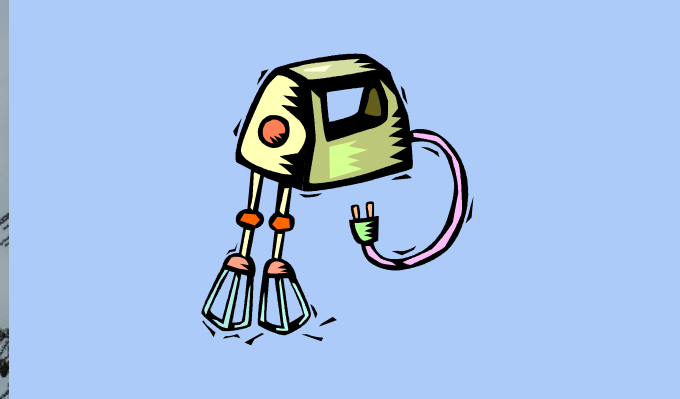
Three 1.14 MG Anaerobic Digesters

80 Feet diameter 28 feet deep

Each digester has (4) 10 HP VFD controlled draft tube mixers







\$38,000 incentive from provider  
One drive runs two mixers.

Saves 250,000 KWH / \$14K annually  
Added project cost \$68K



Payback ~26 months



Help topics

8MX1  
DIG 1 MIXER  
AUTO SEQ.

AUT

NR

RUN

RUN

PAUSE

STOP

8MX2  
DIG 2 MIXER  
AUTO SEQ.

AUT

NR

RUN

RUN

PAUSE

STOP

8MX3  
DIG 3 MIXER  
AUTO SEQ.

AUT

NR

RUN

RUN

PAUSE

STOP

Start at 960 min. past midnight

Set time Current

Dig 1 Step 1:	3	3
Dig 1 Step 2:	57	57
Dig 1 Step 3:	60	60
Dig 1 Step 4:	1320	947

Start at 720 min. past midnight

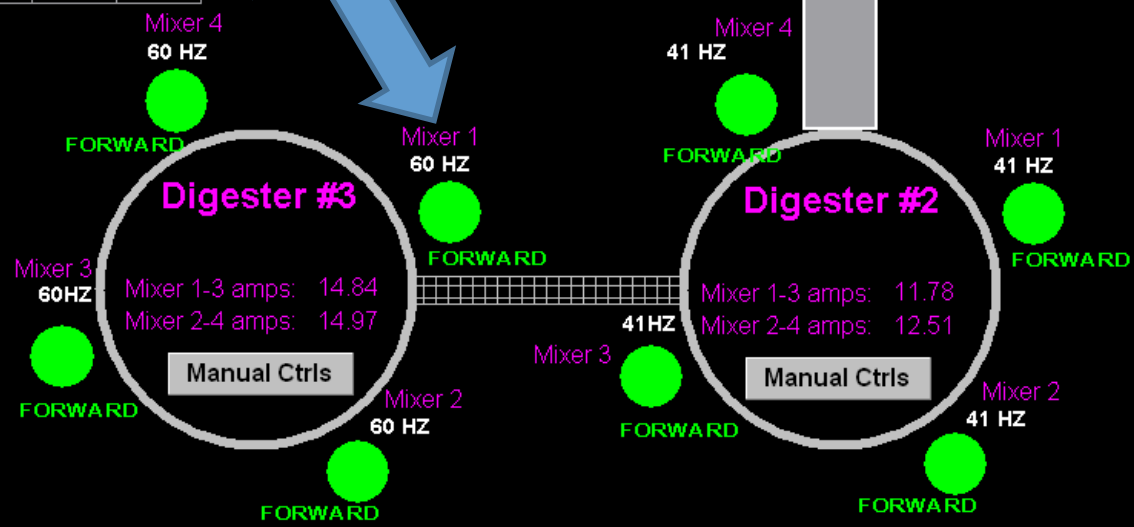
Set time Current

Dig 2 Step 1:	3	3
Dig 2 Step 2:	57	57
Dig 2 Step 3:	60	60
Dig 2 Step 4:	1320	1187

Start at 480 min. past midnight

Set time Current

Dig 3 Step 1:	3	3
Dig 3 Step 2:	57	57
Dig 3 Step 3:	60	47
Dig 3 Step 4:	1320	1320



## Summary

Two Projects- Odorous Air & Digester Mixing

Quick paybacks- 8 months and 26 months

Big savings – Annual 933,000 KWH

Current street value \$57,846 @ \$0.062/KWH

Design and build to operate – not run

Keep evaluating for a better best practice

Bob Sprick Eugene/Springfield Regional WPCF

[robert.g.sprick@ci.eugene.or.us](mailto:robert.g.sprick@ci.eugene.or.us)

541 682-8617

