

Cynthia's Solar Aquatics System

**Prepared by
Brazeau County**

Welcome to Cynthia's Solar Aquatics Waste Water Treatment Facility



Alternate Heating and Power

Sunlight entering building
assists in heating.



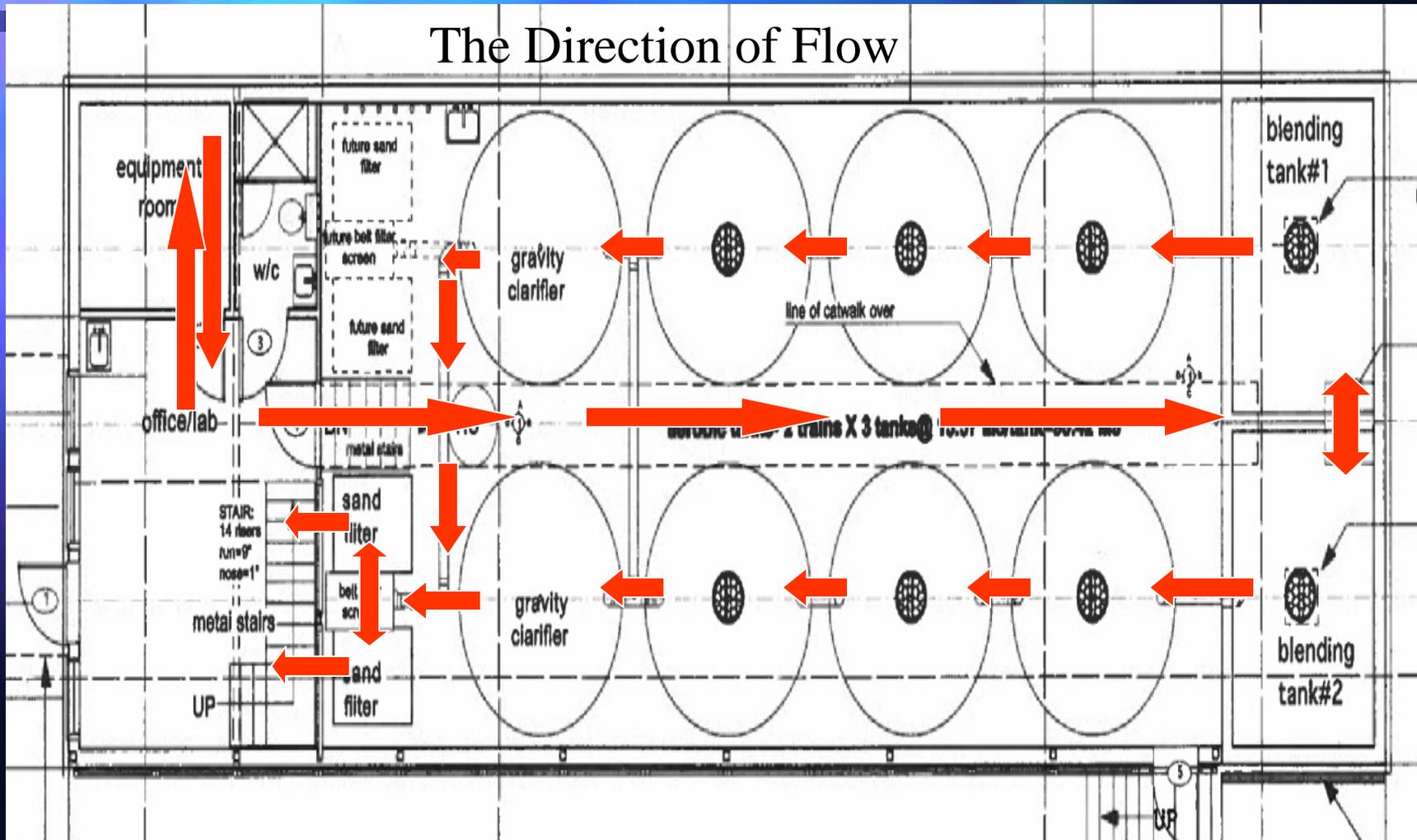
Three Solar heat collectors can be
found on the corner of the facility



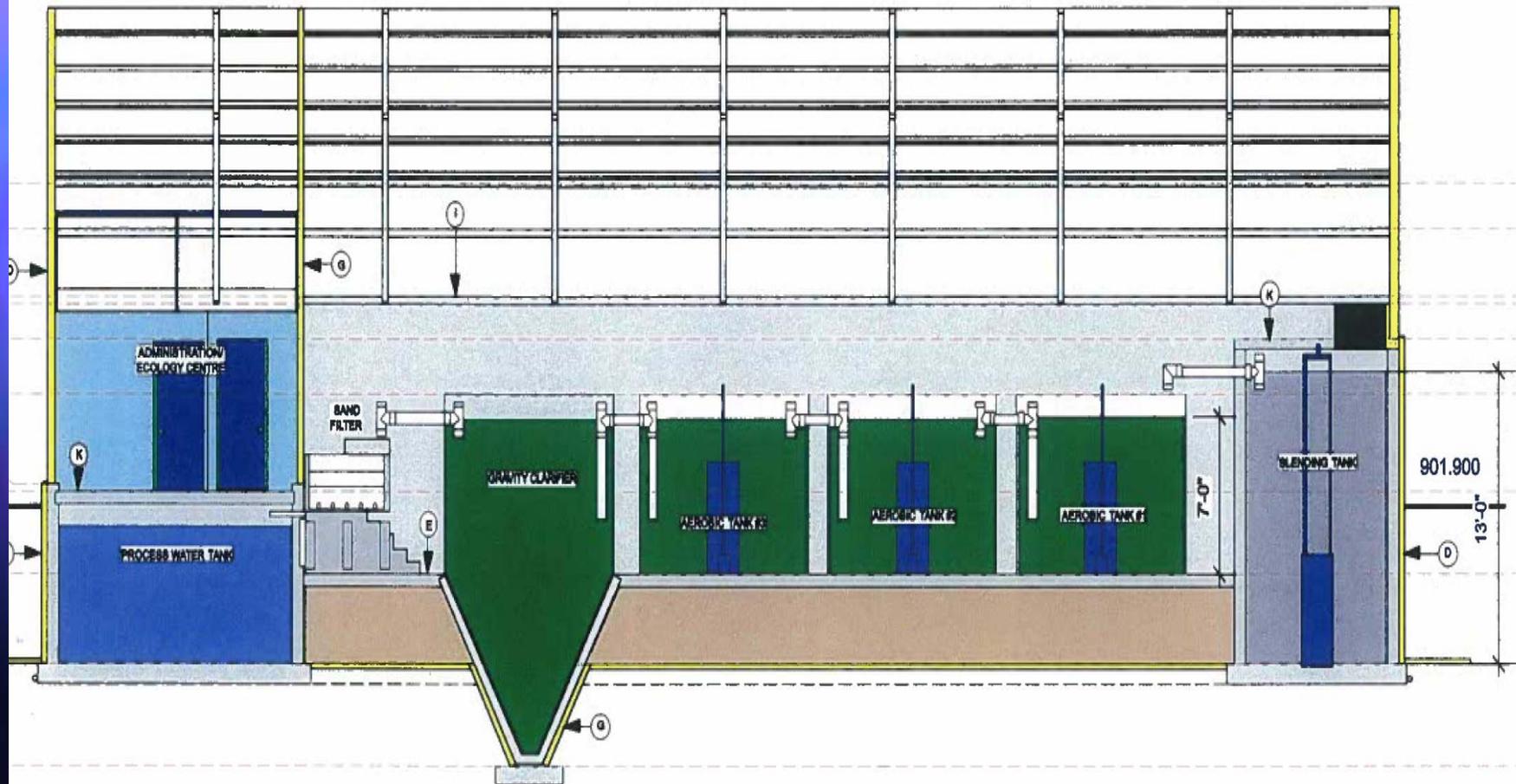
Back up Generator

The Ground Plan

The Direction of Flow



Side Elevation of Facility including tanks





Plant Life on Tanks





Catwalk: Far end is Splitter Box

Splitter Box open; plant bringing in a "load"

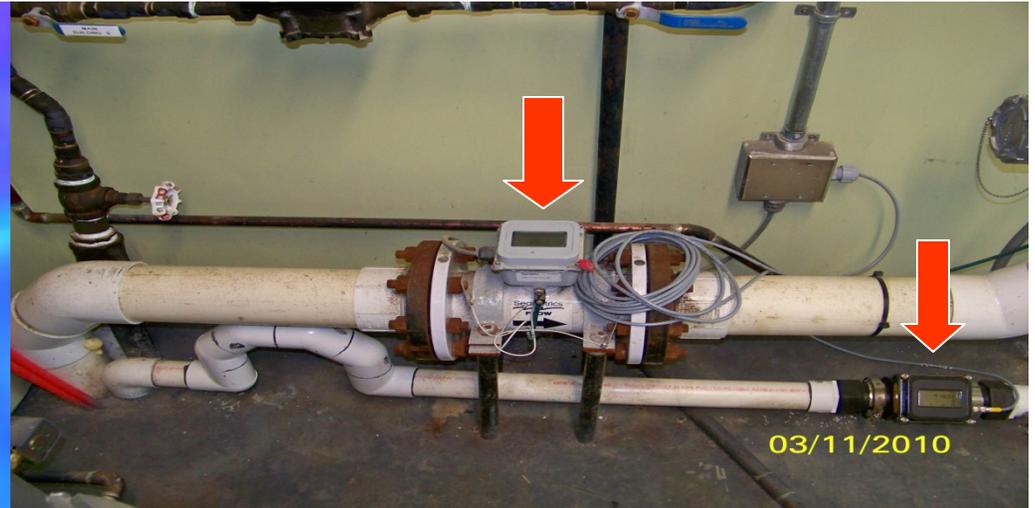
Splitter Box



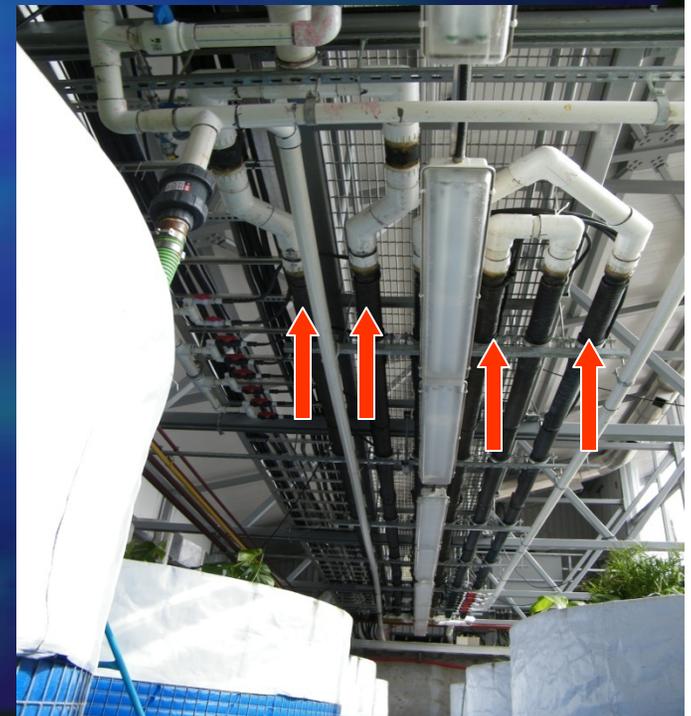
Micro Screen and Sand Filters



Surge Tank Lid opened:
SAS plant in background

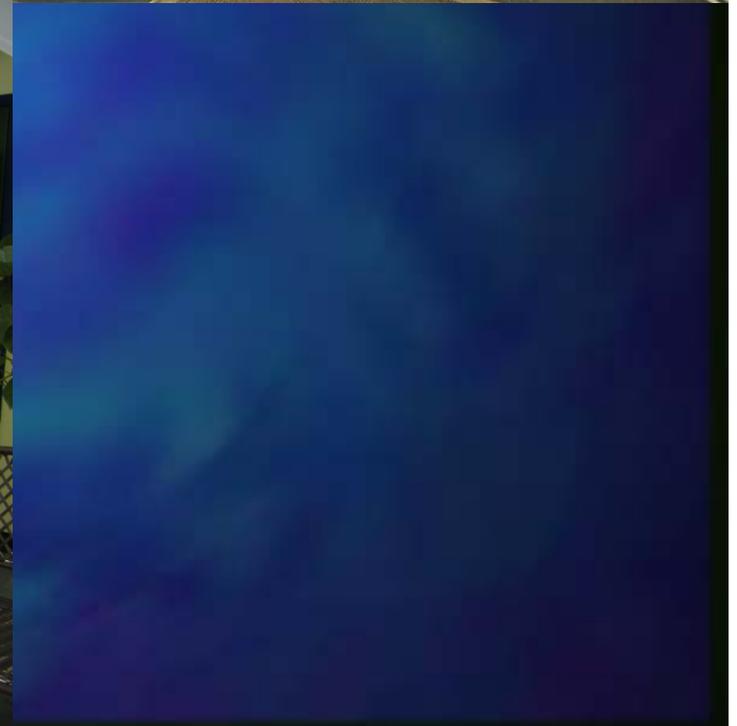


Incoming and Discharge meters



Copper Heat Exchangers below the
Catwalk in Process Room

The Laboratory





RTU unit controls Aeration, back wash, incoming effluent, and many other functions

Measurements/Tests

BOD : Biological Oxygen Demand in milligrams per litre.

A.E. Approval requires 25mg/l

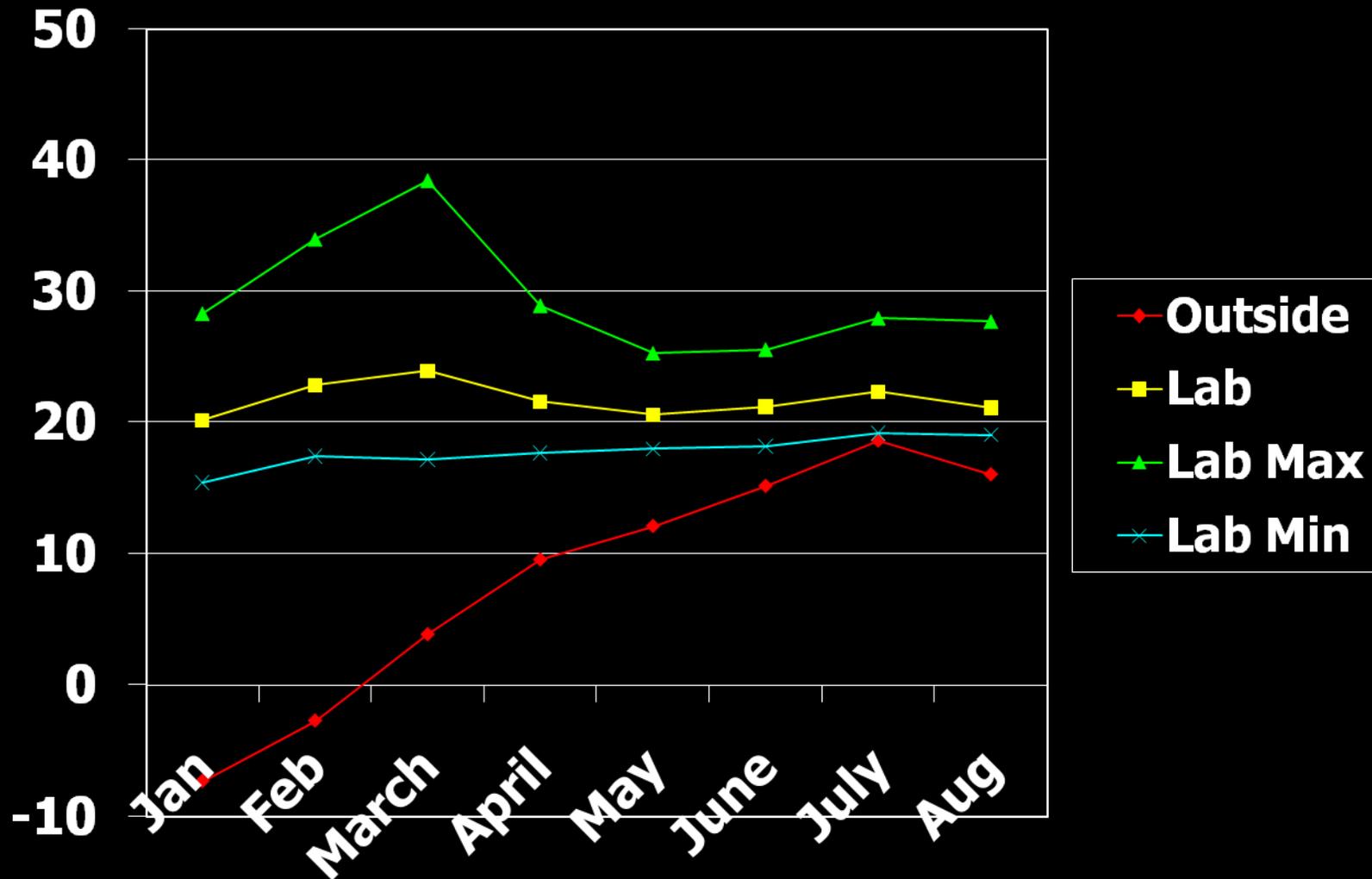
CBOD: Carbonaceous BOD in milligrams per litre measured after the nitrogenous demand has been suppressed.

A.E. Approval requires 25mg/l

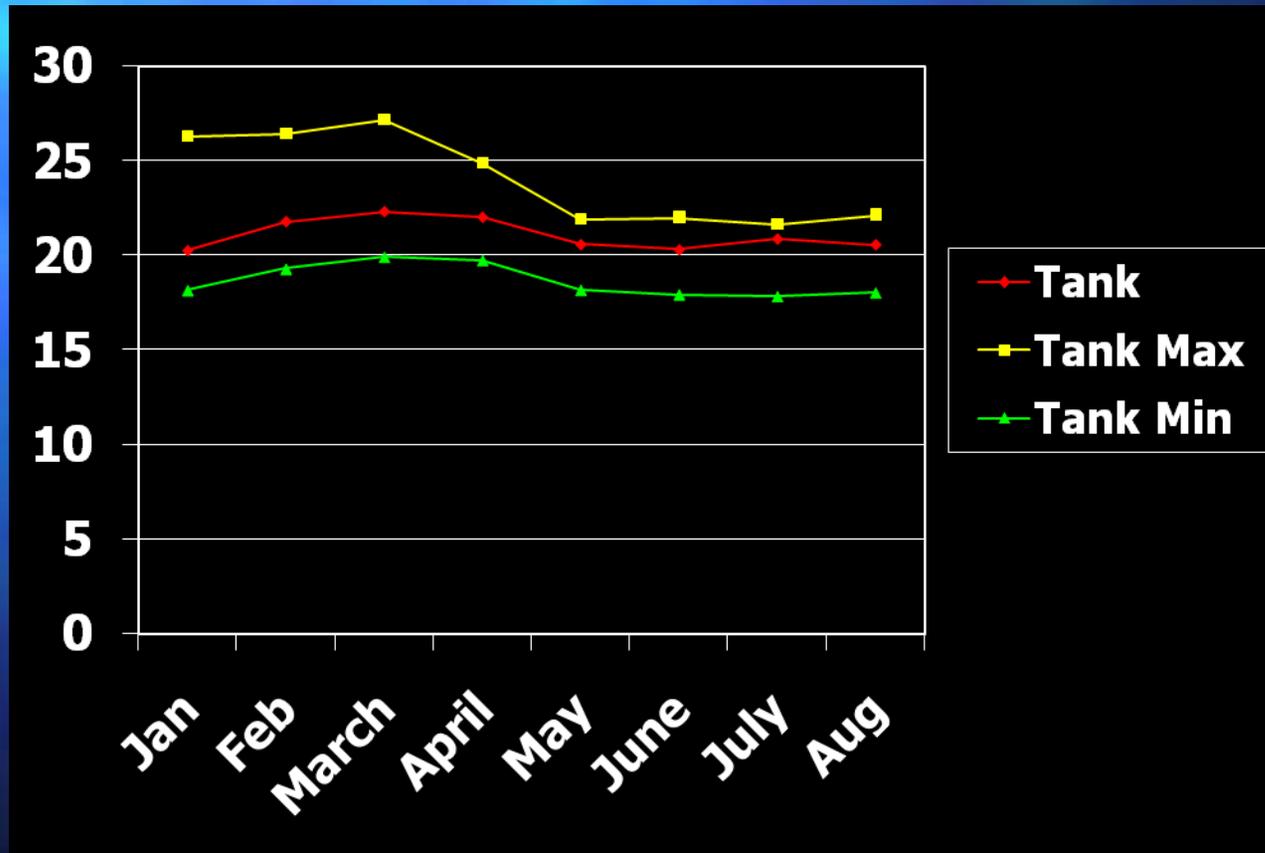
TSS : Total Suspended Solids or non-filterable residue in Milligrams per litre.

A.E. Approval requires 25mg/l

2010 Average Temperatures Lab/Outside

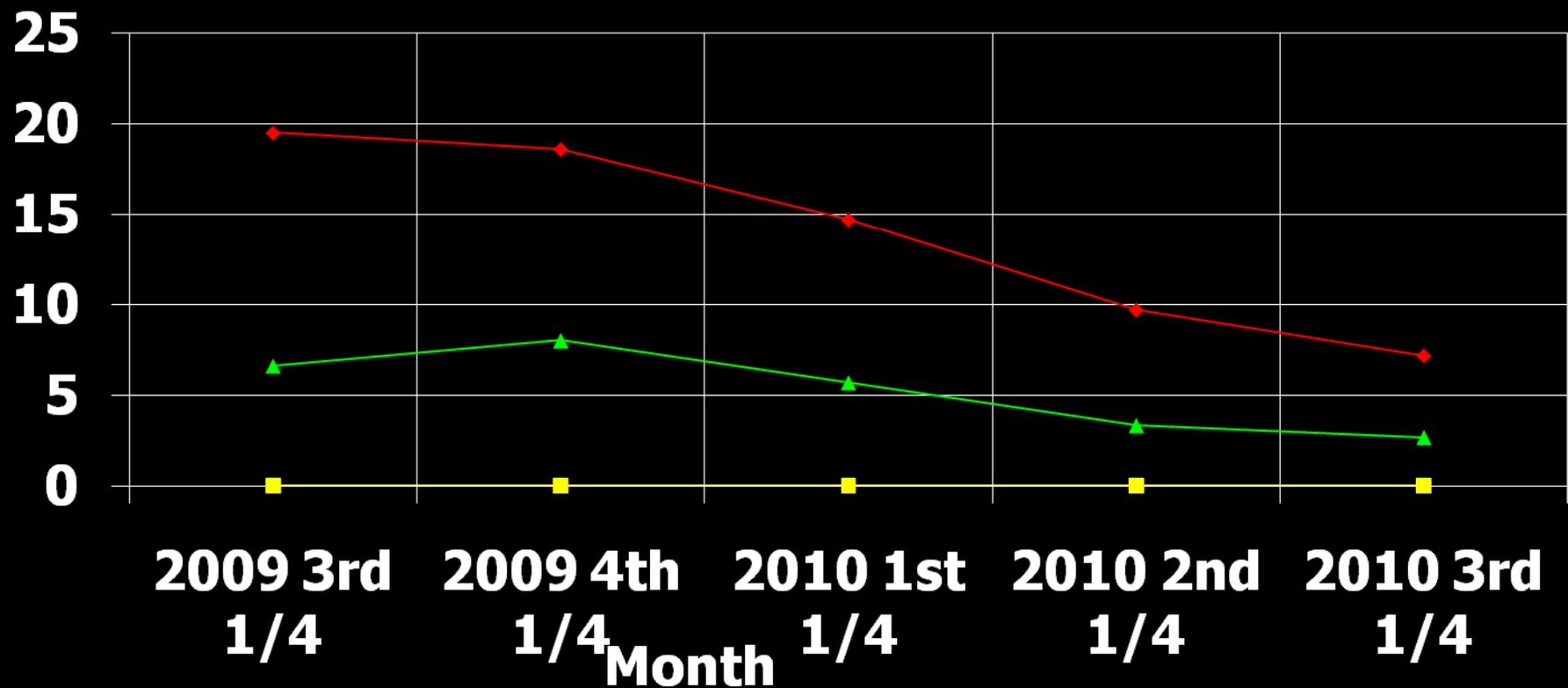
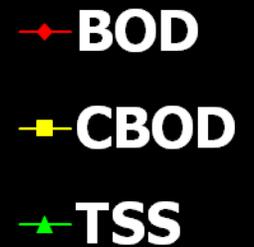


2010 Average Temperatures Process Room



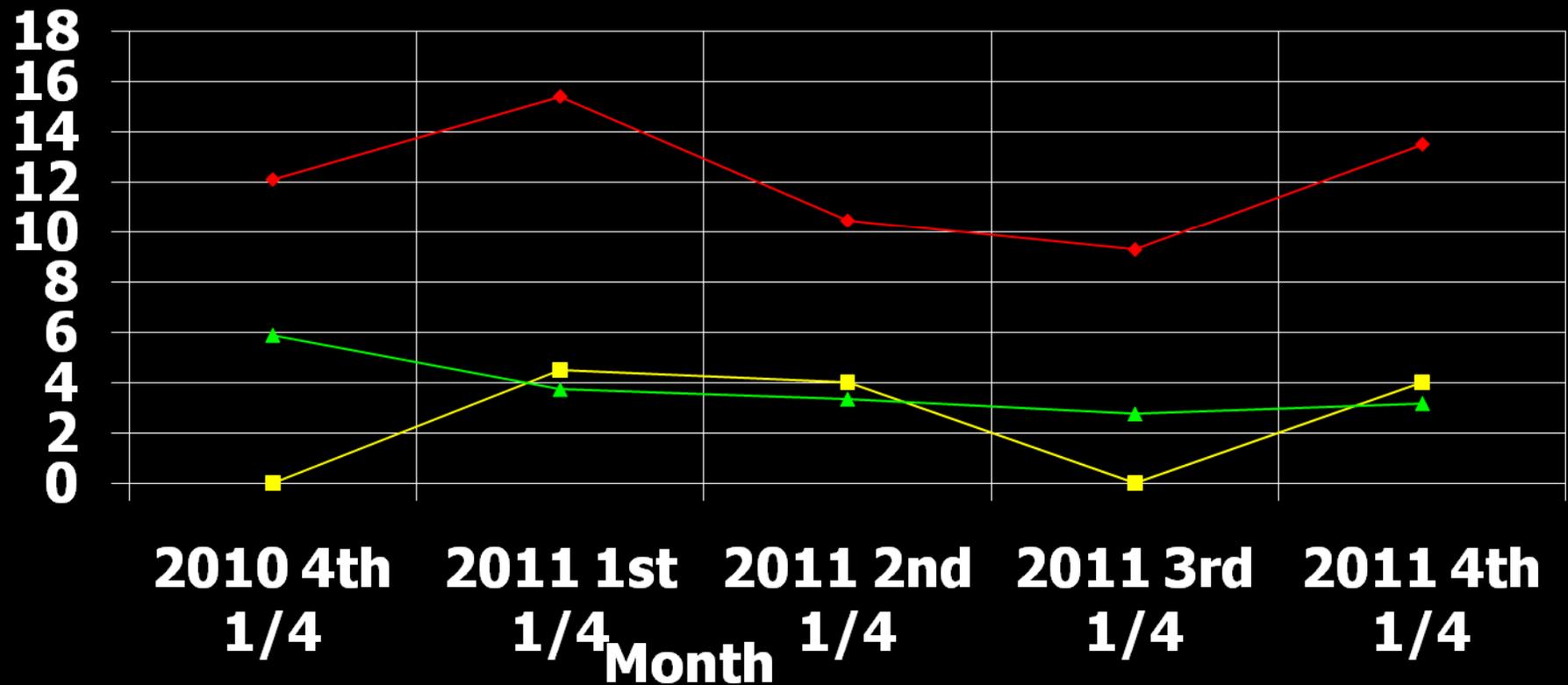
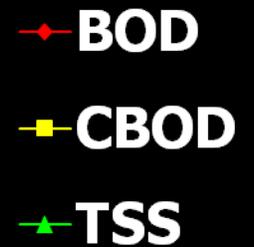
BOD, CBOD & TSS

BOD, CBOD, & TSS Monthly Averages



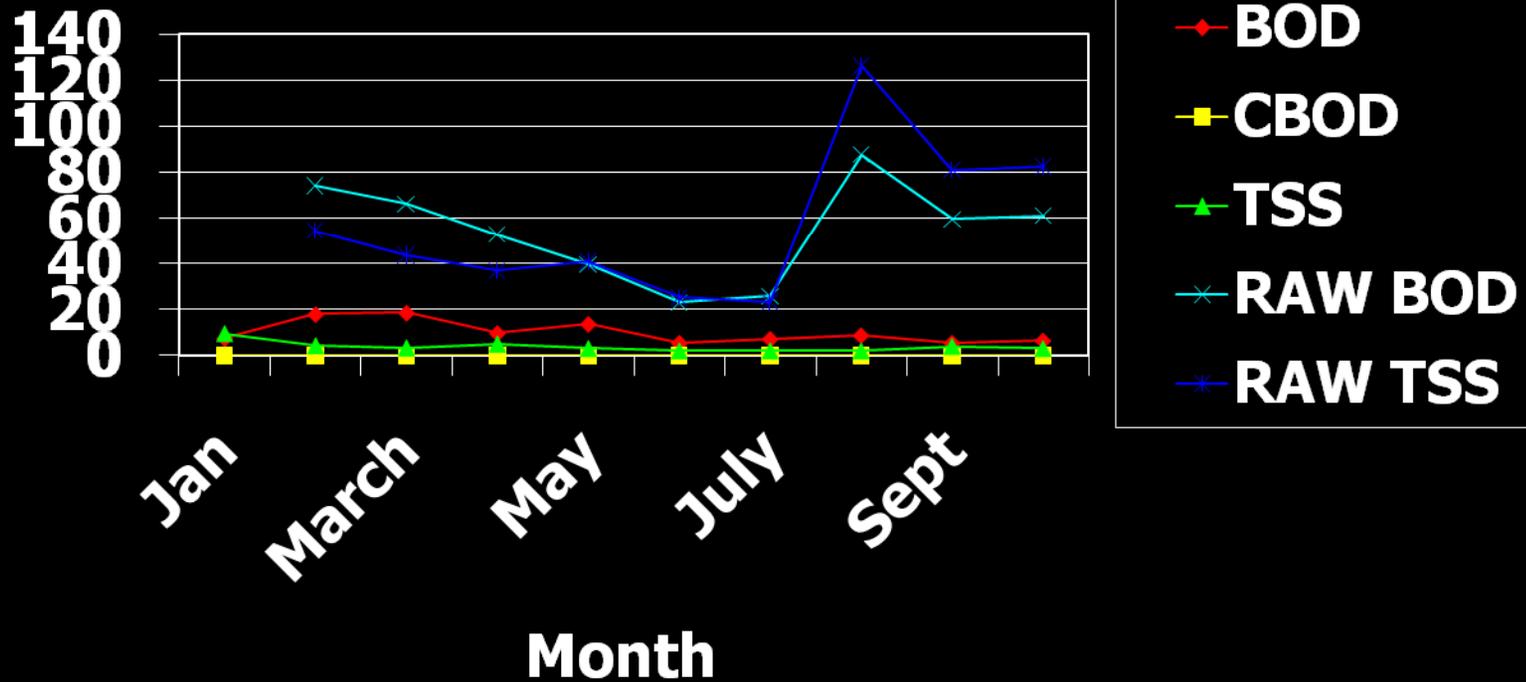
BOD, CBOD & TSS

BOD, CBOD, & TSS Monthly Averages



BOD, CBOD & TSS 2010

BOD, CBOD & TSS Monthly Averages



Lagoon Draining Results

Averages before SAS:

BOD*	TSS**	NH4**	Nitrate	Nitrite	Both	O/G	pH
20	33	0.83	0.08	<0.005	0.08	<5	8.05

*4 numbers averaged ** 3 numbers averaged

June 8, 2010:

BOD	CBOD	TSS	TKN	NH4	Nitrate	Nitrite	Both	O/G	pH
<4	<4	6	1.18	0.50	0.02	<0.005	0.02	<5	8.33

September 8, 2010:

BOD	CBOD	TSS	TKN	NH4	Nitrate	Nitrite	Both	O/G	pH
<4	<4	4	1.62	0.48	<0.01	<0.005	<0.01	<5	8

COSTS

The Capital cost for the project was \$1,674,025.00 with Grant funding at \$1,255,519.00.

An additional \$400,000.00 was spent over the first 3 years of operations to address the deficiencies and changes required.

Cost	Monthly	Yearly
Power	\$800.00	\$9,600.00
Natural Gas	\$400.00	\$4,800.00
Wages	\$2,500.00	\$30,000.00
Horticulturalist, Supplies and Repairs	\$2,084.00	\$25,000.00
Testing Fees (Exova Lab)	\$1,167.00	\$14,000.00
Totals	\$6,951.00	\$83,400.00

Lessons Learned

- Construction Challenges and Deficiencies:
- These include a sludge separation tank that was never connected, numerous pump failures, unfinished floors, leaking pipes and generally unfinished mechanical work.
- Overall we had issues with the general contractor who, after an accident and OH&S investigation quit the project mid way through. The consultant took over for completion but did an inadequate job and increased the cost. It was left to County staff to address the deficiencies remaining.

Lessons Learned Continued.....

- Climate Related :
- HVAC system needed better design. We've had to add a second boiler and an in line heat source in the air exchange unit to react more quickly to dropping temps. when the sun goes down.
- Large temp. fluctuations caused severe moisture buildup from condensation and required the installation of two large de-humidifiers.
- The solar heat collectors lasted one winter then the piping burst.

Lessons Learned Continued.....

- Operations:
- The original venturi type aeration system was non functional and replaced with a conventional system.
- Some trial and error has been required to find the right plants and manage the damaging bugs.
- A larger sand filter will be required to handle the larger than expected volumes due to high population numbers in the warmer months from oilfield workers camping and also infiltration within the collection system.

QUESTIONS ?

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