



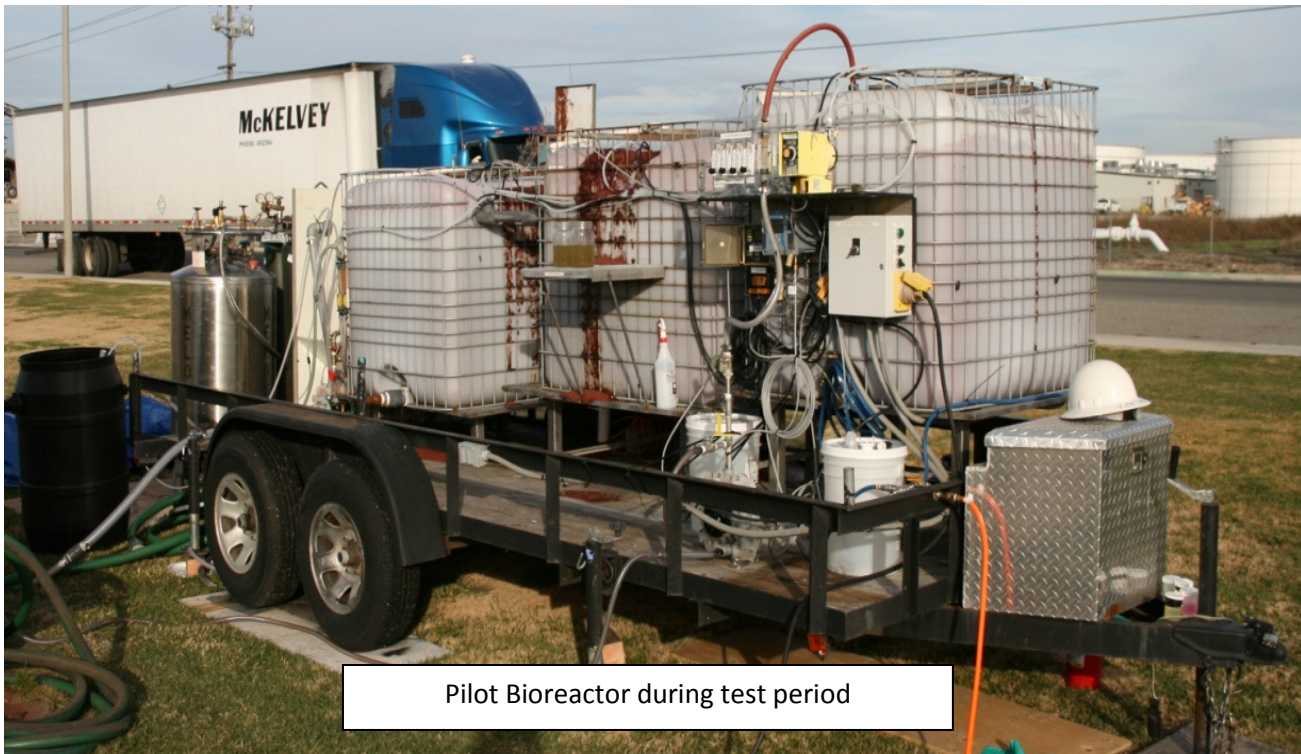
## Tomato Processing Pilot Bioreactor Trial

A tomato processing facility was required by the city to reduce BOD from 4,000 ppm to 200 ppm. Integrated Engineers proposed a small scale Bioreactor to prove the effectiveness of the activated sludge process on the customer's wastewater as well as establishing the parameters for a full scale system design.

The trailer mounted bioreactor utilizes an activated sludge process with pure oxygen instead of the traditional ambient air. The system is designed to operate at ½ gallon per minute and utilizes automatic and manual controls to maintain the pH and dissolved oxygen levels for optimal waste water treatment. Samples were pumped from the influent line and from the clarifier (effluent) in order to determine the reduction in BOD. Some of the Effluent samples were also treated with Floccin 1105 to determine added benefit of Floccin treatment.

The trailer mounted Bioreactor was setup to pump wastewater from the customer's wastewater flume and return the treated water to the same flume. This setup allowed the bioreactor to treat the wastewater produced in normal operating conditions over a 2-½ week test period.

Results from the trial showed that the BOD could be reduced to less than 100mg/L through the activated sludge process.



Pilot Bioreactor during test period

During the pilot test period, Integrated Engineers was able to vary the conditions of operation in order to observe the effect on the quality of the treated water. The results of the trial can be seen in the table below. Note the Flocked samples reduced the suspended solids, but had negligible effect on the BOD.

**Table 1: BOD Reduction Data, Influent, Effluent Flocked.**

Date	Influent		Effluent			Flocked		
	BOD (mg/l)	TSS (mg/l)	BOD (mg/l)	% Reduction	TSS (mg/l)	BOD (mg/l)	% Reduction	TSS (mg/l)
8-Dec	2900	200	270	85%	160			
8-Dec	2300	250	230	87%	140			
9-Dec	1900	170	220	88%	160			
9-Dec	1700	200	190	89%	150			
10-Dec	2600	1700	110	94%	150			
10-Dec	960	460	120	93%	190			
10-Dec	1900	940	130	93%	220			
12-Dec	400	230	160	91%	260			
12-Dec	1200	450	110	94%	190			
12-Dec	580	580	110	94%	220			
13-Dec	460	340	71	96%	160			
13-Dec		680			140			
13-Dec		2100			160			
14-Dec	580	190	71	96%	150			
14-Dec	340	440	71	96%	140	44	98%	39
14-Dec	760	69	81	95%	170	45	97%	21
15-Dec	2100	630	81	95%	240			
15-Dec	1700	990	220	88%	220	72	96%	110
16-Dec	3500	3000	400	78%	350			
17-Dec	3800	1300	430	76%	440			
19-Dec	2300	810	300	83%	270	32	98%	45
19-Dec	3200	1300	300	83%	400	45	97%	54
20-Dec	2300	980	150	92%	260	32	98%	39
20-Dec	1700	740	150	92%	250	32	98%	21
21-Dec	1700	400	150	92%	220	37	98%	23
21-Dec	1700	290	150	92%	190	44	98%	54
22-Dec	2000	740	110	94%	300	32	98%	18
<b>Average</b>	<b>1783</b>	<b>747</b>	<b>175</b>	<b>90%</b>	<b>219</b>	<b>43</b>	<b>98%</b>	<b>45</b>

The picture below shows samples for untreated (left), Treated (middle) and Treated & Flocked (right). The sample in the middle is treated water that was taken from the secondary clarifier effluent which drained to the City sewer. The sample on the right was from the secondary clarifier effluent and treated with Floccin 1105 to look at further reduction of the BOD and TSS levels.



**Untreated, Treated and Flocked Samples**

Integrated Engineers was able to use the empirical data from the trial to establish parameters for the design of a full scale wastewater treatment system.