

Mebane Bridge WWTP

EDEN, NC • AUGUST 8, 2016



EXECUTIVE SUMMARY

In August of 2016, a two-week CleanB® demonstration was performed at the Mebane Bridge WWTP in Eden, North Carolina. The CleanB® demonstration unit utilizes a patented chlorine dioxide generation system followed by a 10-minute contact chamber. The demo unit was shipped and connected on 8/7/16 and started processing waste activated sludge on 8/8/16. The City of Eden is in a position where they need to invest significant capital into improving their digester in order to meet current and future demand. The CleanB® system was evaluated during this process as an alternative to digestion due to its simple nature and ease of operation. In their current operation, the facility wastes from clarifiers directly to an aerobic digester, where it is then fed to a sludge holding tank prior to contract dewatering and disposition. After temporarily installing the CleanB® demo system, the waste activated sludge was pumped directly from the clarifier to the holding tank, through the CleanB®, and to the belt-press for dewatering.

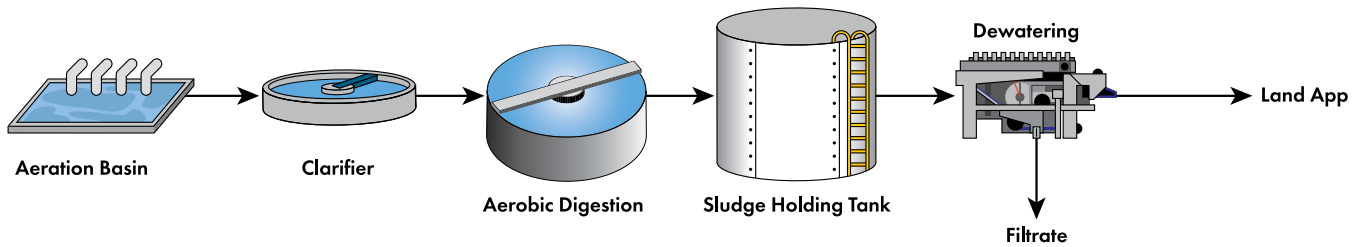


Figure 1: CleanB® Demo Unit installed at Mebane Bridge WWTP

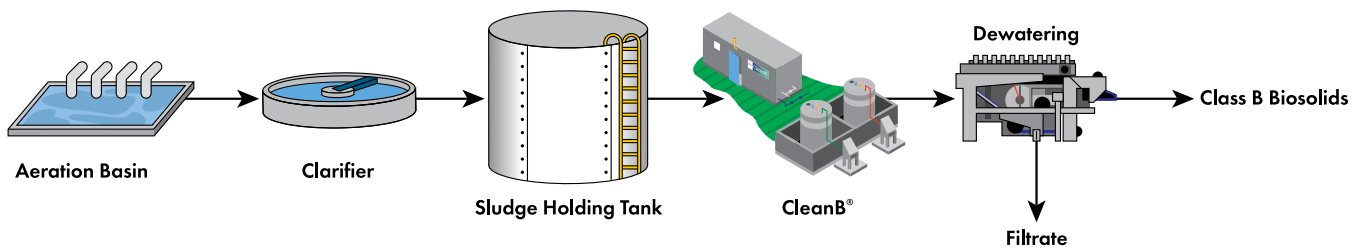
Notable Findings From The CleanB® Demonstration Are Outlined Below:

- 1) Dewatered percent total solids improved by 28% (from a 18%TS average to a 23%TS average),
- 2) Polymer consumption improved by 28% (from 22.9 lbs to 16.5 lbs polymer per dry ton),
- 3) An average log reduction of 2.87 was achieved with CleanB® treatment,
- 4) Odors were greatly reduced when compared to normal aerobic digestion biosolids treatment.

CURRENT MEBANE BRIDGE WWTP PROCESS FLOW DIAGRAM



CLEANB® DEMO PROCESS FLOW DIAGRAM



CLEANB® DEMO DISINFECTION RESULTS

Fecal Coliform samples were taken over the course of 5 days during the CleanB® Demo. Both untreated ("raw") and treated samples were taken on each of the 5 days and analyzed at Pace Analytical Services. Fecal coliform log reductions averaged 2.87 for the 5 days. The table below summarizes the results:

	Fecal Coliform (CFU/g TS)		Log Reduction
	Raw	Treated	
8/08/2016	1,551,724	1,818	2.93
8/9/2016	>576923	1,894	>2.48
8/10/16	NA	68,000	NA
8/11/2016	1,562,500	4,821	2.51
8/12/2016	2,197,802	699	3.50
8/16/2016	1,562,500	<2,066	>2.87

POLYMER CONSUMPTION COMPARATIVE

The CleanB® demo unit significantly reduced polymer consumption. The polymer consumption while utilizing the CleanB® treatment decreased by 28% when compared to their normal aerobic digestion treatment process. These results are likely conservative because (1) the WAS feed to the CleanB® was much lower (ranging from 0.5%TS-1.2%TS) than normal operations (ranging from 1.8%TS – 2.2% TS), and (2) the percent total solids feeding the CleanB® system had high fluctuations due to settling conditions in the holding tank. Another challenge that affected the results were the inconsistent solids leaving the clarifier which made it difficult to optimize polymer flow. Clarifier solid concentrations fluctuated drastically because the solids were spread thin over all four clarifiers, often pumping supernatant to the holding tank. This was the case since the pump that was originally designed to pump to the holding tank from just two of the clarifiers could not handle the head pressure required to overcome the slope gradient from the pump to the holding tank. The table below summarizes the polymer consumption rates of each biosolids treatment process.



	Digestion			CleanB® Demo
Date	7/26/2016	7/27/2016	8/3/2016	8/11/2016
Lbs Polymer	127	127	153	34
DT processed	5.09	6.06	6.7	2.06
lbs polymer/DT	24.95	20.96	22.84	16.50

DEWATERED SOLIDS COMPARATIVE

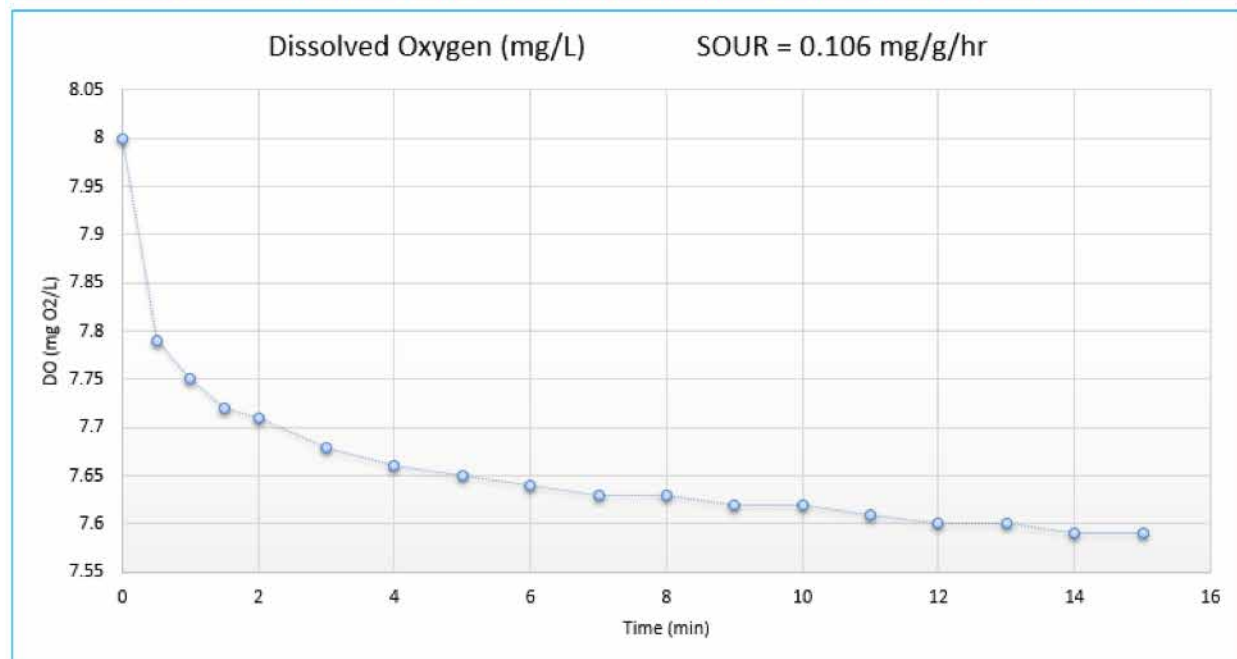
In addition to less polymer consumption, the CleanB® produced a much drier cake; there was an observed 28% increase (from 18% to 23% cake solids) in cake solids with CleanB® treatment. The change in cake solids equates to a 22% reduction in wet weight. The cake solids from CleanB® treated material ranged from 21.5% to as high as 26.5%. The pictures below show the results of dewatered CleanB® biosolids. The picture on the left shows untreated sludge dewatered beneath CleanB® treated material, and the picture on the right shows a dewatered sample that was analyzed at 26.47%TS.

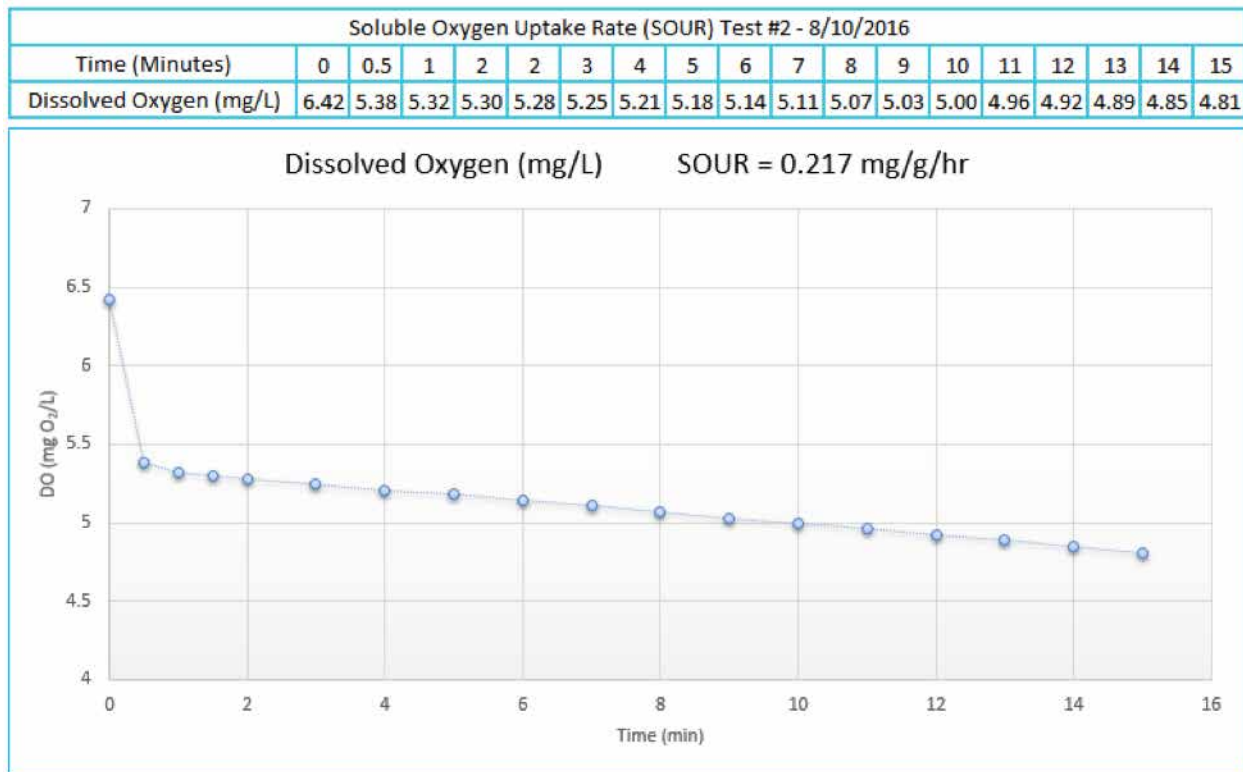


CLEANB® VECTOR ATTRACTION REDUCTION (SOUR) RESULTS

The charts below show the soluble oxygen uptake rate (SOUR) results from two different CleanB® treated samples collected on 2 different days. Each sample passed the < 1.5 mg O₂/g/hr test.

Soluble Oxygen Uptake Rate (SOUR) Test #1 - 8/9/2016																		
Time (Minutes)	0	0.5	1	2	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Dissolved Oxygen (mg/L)	8.00	7.79	7.75	7.72	7.71	7.68	7.66	7.65	7.64	7.63	7.63	7.62	7.62	7.61	7.60	7.60	7.59	7.59





CONCLUSION

Based on the results of the demonstration, the CleanB® process meet the requirements for Class B pathogen reduction and vector attraction reduction requirements for land application. Dewatering was improved, with increased cake solids noted along with a decrease in polymer use.

Shortly after the demonstration, the City of Eden purchased the CleanB® system to treat all of their biosolids. The CleanB® was successfully commissioned in November of 2019 and has provided a simple and effective process that meets and exceeds regulatory requirements, improves cake solids, reduces odors, decreases polymer consumption and improves facility capacity.

BCR appreciates the opportunity to be a long-term partner with the City of Eden. For more information, please contact marketing@bcrinc.com.